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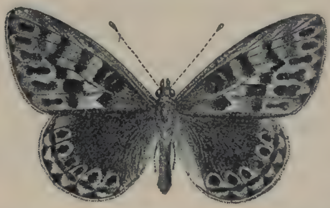
ARGYNNIS EUPHROSYNE, Ab.

By W. Parkinson Curtis.



The above figure represents a variety of *Arygnnis euphrosyne*, which I had the good fortune to capture on the 10th June, 1897, flying in a "ride" in Bere Wood, near Bloxworth, in the county of Dorset. It is a very fresh and quite perfect specimen (though late), the species being in full force here on the 20th of May.

On the upper surface the ground colour of the wings is not the usual fulvous brown, but a raw sienna colour. On the fore wings the usual markings are all present, but considerably emphasised, and most of them confluent. The spots along the outer marginal area of the wings are connected, forming reniform marks. The hind wings are almost entirely occupied by the dark brown colour, the outer marginal portions of the cells have a row of spots of the raw sienna colour centred with dark brown, and the usual pearl border is reduced by the encroachment of the dark brown to a series of triangular raw sienna-brown spaces.

On the under side the chief difference of the fore wings from the type is on the outer margin, where of the two usual rows of black spots the inner row only is present, the other row being converted into a series of conical darkish marks, the apex of each touching the corresponding dark mark of the inner row. On the hind wings the first two cells on the abdominal margin of the wings are entirely occupied by a dark greenish brown. All the usual silvery marks are present, but the space between the median and posterior marginal markings is almost entirely occupied by dark sienna-brown.

NOTES ON AQUATIC RHYNCHOTA. No. 1.

By G. W. Kirkaldy.

Fam. Hydrometridæ.

1. *Hydrometra greeni*, Kirk., n. sp.—Dark fawn colour; eyes black; length of head from eyes to apex nearly two and a third times greater than from eyes to base, wider between the antenniferous tubercles than at the base. Antennæ—first segment thicker apically than basally, not half the length of the second, which is not nearly half as long as the third. Hemielytra short, reaching to the base of the fifth abdominal segment; nervures pale violet brown. Femora reddish violet. Abdominis dorsum (except connexivum and genital segments) dark violet brown. Ventral surface pale fawn colour, destitute of silvery pubescence. Length 11·5 mm. Type, ♀; my collection.

Hab. Punduloya, Ceylon (*E. Ernest Green*, May, 1897).

Not unlike *H. stagnorum*, L., differing in the colour and in the proportions of the head and antennæ. The apical part of the head (anterior to the eyes) is longer than in the latter species, and the second antennal segment longer in proportion to the first. It is destitute, moreover, of the dense silvery pubescence which, in *H. stagnorum*, forms such a striking contrast to the prevailing black colouring.

H. greeni is the first true *Hydrometra* recorded from Ceylon, or indeed from the Oriental Region; *nitida*, *pectoralis*, and *discolor* referred to this genus by Mayr (Novara Reise, Hem. pp. 170–2) belonging to the genus *Gerris*.

2. The following species have apparently been omitted from Lethierry and Severin's 'Catalogue,' vol. iii.:—Page 54. *Hydrometra lineata*, Say? 1832, Descr. Het. Hem. (New Harm.), p. 35 (reprinted 1857, Trans. N.Y. Agric. Soc. p. 806, and 1869, Compl. Writ. i. p. 361) = *Limnobates lineata*, Uhl., 1894, Proc. Cat. Acad. Sci. (2) iv. p. 288. *U.S.A.* [With regard to Dr. Montandon's remarks (1896, Ann. Ent. Belge xl. 508) as to the correct date of Say's paper, it may be noted that no original copies appear to be extant, and that the date in the 1857 reprint may be an error.] Page 60. *Gerris canaliculatus*, Say, *l. c.* (reprints, pp. 807 and 363 respectively). *Georgia.*

Fam. Gelastocoridæ.

It is probable that *Nerthra*, Say, *l. c.* (type, *N. stygica*, Say), should replace *Mononyx*, Lap., 1832, Mag. Zool. p. 16; but on account of the uncertain date of the former work, and the unsatisfactory description of the genus, it will be better, perhaps, to retain the latter name.

Fam. Belostomatidæ.

1. *Pedinocoris macronyx*, Mayr. Prof. Carl F. Baker has

kindly lent me an imago and a larva of this species from Arizona, U.S.A. It has been seldom recorded, and seems scarce. Mayr (1863, Verh. z-b. Ges. Wien, xiii. pp. 347–51) gives a long description, with figures (pl. xi. f. 1–4), recording it from California and Mexico. In 1871, in the same journal (vol. xxi. p. 405), he mentions that the latter locality was a mistake. Prof. Uhler (1894, Proc. Cal. Ac. Sci. (2), iv. p. 292) records it from Lower California, but it does not appear to have been independently mentioned elsewhere. The maximum breadth of Prof. Baker's specimen exceeds that of the type (sec. descr.) by 2·5 mm.; the breadth of the base of the pronotum is 13 mm. None of the preparatory stages appear to have been known either to Mayr or other writers. The above-mentioned larva is in the ultimate stage and, as one would expect, differs very little from the imago beyond the customary shorter pronotum, absence of hemielytra, &c. The two large deep pronotal variolations are more pronounced, and the base of the pronotum is straighter in the larva. The "metasternal episternites" (Joanny Martin, Bull. Mus. Paris, Aug. 1896, p. 1 [sep.]) are present, and are of great size. Rhynchotists will await with great interest the results of M. Martin's researches upon these remarkable appendages.

This species should serve as the type of Mayr's genus.

Fam. Corixidæ.

1. *Corixa holda*, n. n. for *Corixa fasciolata*, Heer, 1853, Insektenf. tertiärg. Oening. iii. 86 (nec Muls. Rey, 1852).

2. *Corixa hieroglyphica*, Duf. This species has a very wide distribution, practically the whole of the Palæarctic Region, (including the Canary Isles), Yarkand, North America, &c., and Mr. Malcolm Burr has lately given me specimens (♀ ♀) from Assam (Chenapungi, Khasia Hills).

3. *Micronecta*, Kirk. In the last volume (p. 240) of the 'Entomologist,' I referred *Corixa albifrons*, Motsch., to the genus *Sigara*, stating that I did not know the species. Dr. Horváth has since kindly sent me two fine specimens from Ceylon, which he has determined as the above species, and which fully accord with the original description. On making fresh investigations, it appears that the examples are also, undoubtedly *Sigara siva*, Kirk. (Dr. Horváth has expressed his entire concurrence in this opinion), and I believe further that *Micronecta ovivora* (Westw.) is merely a bleached example of the same. The name "*striata*, Fieb.," which became dormant (Ent. 1897, p. 240) in *Sigara* is, as Dr. Horváth has pointed out, available for *Micronecta*, and the species will now be known as *Micronecta striata* (Fieb.).

It will be useful to briefly recapitulate the synonymy:—

Sigara striata, Fieb. (nec Fabr.).
Corixa albifrons, Motsch.
Corixa ovivora, Westw.

Sigara ovivora and *siva*, Kirk.

Moreover, "*lineata*, Fieb.," dormant in *Sigara*, must be revived for *Micronecta*, displacing *S. M-notata*, Kirk.

Although Fieber's description of *S. striata* (1844, Abh. böhm. Ges. Wiss. (5), iii. 292) is sufficiently precise, as far as it goes, his figure (pl. i. f. 22) is inaccurate, especially with regard to the pronotum, the lateral margins of which are "very short, . . . about one-seventh (roughly) of the middle breadth of the pronotum," but are scarcely indicated in the figure, and while the latter represents only one central transverse stripe on the pronotum, the diagnosis correctly indicates "Pronotum mit drei schwarzen Querlinien," this being amplified in the ensuing description. In consequence of this faulty figure, and the fact that it was not possible to examine the palæ of the male type of *ovivora*, I did not appreciate the conspecificity of these three species until after an examination of Dr. Horváth's specimens.

THE ASIATIC DISTRIBUTION OF BRITISH GEOMETRIDÆ.

(Concluded from vol. xxx. 316.)

Melanippe (Cidaria) procellata, Fb. = *inquinata*, Butl.
Hydriomena procellata, Meyr.

Occurs in Amurland, Corea, Japan, Yesso, and Central and Western China.

Mr. Leech, referring to his series of this species from China, Japan, and Corea, states that "there are specimens which exactly agree with typical *procellata*; others are identical with *inquinata*, Butl.; and others again are almost unicolorous fuliginous brown. All these forms are connected by intergrades."

Melanippe (Plemyria) rivata, Hb. = *supergressa*, Butl.

Specimens identical with European forms occur in Amurland, Japan, Yesso, and Corea.

Melanippe (Plemyria) bicolorata, Hufn.

Occurs in Amurland, Japan, and Yesso.

"Japanese examples are larger, but do not otherwise differ from European specimens."

Melanthia (Cidaria) albicillata, Linn.
Hydriomena albicillata, Meyr.

Recorded from Amurland, Japan, and Yesso.

Mr. Leech remarks:—"Except that they are generally rather larger, there is no important difference between Japanese examples (*casta*, Butl.) and European specimens of the same species. The discal spots are a trifle larger, and the marginal border of secondaries is uninterrupted."

Cidaria picata, Hb.
Hydriomena picata, Meyr.

Occurs in Central and Western China.

"The specimens show variation in the width of the lines forming the central band, and also in the width of the white border of the band; in a large proportion of them the secondaries are devoid of marking on the upper surface. The examples from Central China are rather smaller than the majority of those from the west, and appear to be more constant in always having the band composed of broad and often confluent lines."—(Leech).

Cidaria corylata, Thnb. =*fabrefactaria*, Oberth.
Hydriomena corylata, Meyr.

Found in Amurland, Isle of Askold, and Japan.

The variation of the species in Eastern Asia is similar to that which occurs in European specimens.

[*Cidaria fulvata*, Forst. A close ally of this species is described by Mr. Leech from Western China under the name *Cidaria ochracearia.*]

[*Cidaria yokohamæ*, Butl. Mr. Leech thinks that this may possibly be an Eastern Asian form of *Anticlea* (*Cidaria*) *cuculata*, Hufn.]

Cidaria (Larentia) suffumata, Hb. = *minna*, Butl.
Hydriomena suffumata, Meyr.

This species is found in Western China, Japan, and Yesso.

Mr. Leech considers *C. minna*, Butl., from Japan, to be a small form of *C. suffumata*, and mentions that one of his Japanese specimens is only 24 millim. in expanse.

Cidaria (Larentia) truncata, Hufn.
Hydriomena truncata, Meyr.

This species is represented in E. Siberia, Amurland, Isle of Askold, Japan, Yesso, Kiushiu, and Western China by forms that are somewhat similar to, although not exactly identical with, some of those occurring in Europe.

Cidaria (Larentia) immanata, Haw.

Occurs in Central and Western China, Japan, and Yesso.

The type and var. *marmorata* are each represented, and some of the specimens approach var. *thingvallata*, Staud.; the latter are from Nemora in the north of Yesso.

Mr. Meyrick and Sir George Hampson treat this species as a form of *C. truncata*.

Cidaria silaceata, Hb.
Hydriomena silaceata, Meyr.

This species is found in Amurland, Japan, Kiushiu, and Central and Western China.

Central Chinese specimens range from 26–34 millim., and Western Chinese from 30–38 millim. in expanse. Howkow examples have typical fore wings; but the hind wings are almost entirely without marking.

A form from Western China, described as var. *angustaria*, Leech, has all the wings narrower than the type; both surfaces are heavily suffused with fuliginous, and the white transverse lines of fore wings are strongly defined.

CIDARIA (EUSTROMA) RETICULATA, Hb.

Recorded from E. Siberia, Amurland, Corea, Japan, Yesso, Central and Western China, and Sikkim.

Mr. Leech states: "In China and Japan this species is generally represented by *ærosa*, Butl., which is identical with *inextricata*, Walk., but I have typical specimens from Hakodate, Omei-shan, and Chia-kow-ho."

CAMPTOGRAMMA (CIDARIA) FLUVIATA, Hb.
Hydriomena fluviata, Meyr.

Occurs in Eastern and Western China, Japan, Corea, India, Ceylon, and Burma.

COREMIA (CIDARIA) DESIGNATA, Hufn.=*propugnata*, Fb.
Xanthorhoe designata, Meyr.

Recorded from E. Siberia, Amurland, Japan, and Yesso. Specimens agree with European examples.

COREMIA (CIDARIA) QUADRIFASCIARIA, Clerck=*ignobilis*, Butl.
Xanthorhoe quadrifasciaria, Meyr.

Occurs in Amurland, Japan, and Yesso.

Referring to Japanese specimens, Mr. Leech says some are much suffused; "others agree with the type of '*S*' *ignobilis*, Butl., in the National Collection at South Kensington."

ANTICLEA (LARENTIA) BADIATA, Hb.
Hydriomena badiata, Meyr.

"The central fascia of primaries and the secondaries are whiter in Japanese specimens than in any example in my European series" (Leech).

Only recorded from Japan.

EMMELESIA (LARENTIA) TÆNIATA, Steph.=*fulvida*, Butl.
Hydriomena tæniata, Meyr.

Occurs in Western China, Japan, Yesso, and Kiushiu.

"In the Japanese specimens the central band of primaries is broader than in European examples; and the space between this band and the basal patch is deeply suffused with fuliginous" (Leech).

HYPSIPETES (LARENTIA) SORDIDATA, Fb.=*elutata*, Hb.
Hydriomena elutata, Meyr.

Occurs in Amurland, Japan, and Western China.

Specimens are of forms similar to those occurring in Europe.

THERA (LARENTIA) VARIATA, Schiff.
Hydriomena variata, Meyr.

Modifications of the *obeliscata* form occur in Japan, Corea, and North-east China.

[*Larentia comis*, Butl., from Japan, is very like some European *T.* (*L.*) *variata*, but the antennæ are shortly bipectinate.]

[*Oporabia dilutata*, Bork., is replaced in Japan by a very closely-allied species, *O. nexifasciata*, Butl.]

EUPITHECIA CASTIGATA, Hb.
Tephroclystis castigata, Meyr.

Occurs in Amurland, Japan, and Western China.

EUPITHECIA CORONATA, Hb.
Chloroclystis coronata, Meyr.

Mr. Butler has described this species from Japan as *E. lucinda*. The specimens do not differ from European examples.

[*Eupithecia rectangulata*, Linn. — Mr. Leech is of opinion that *Lobophora julia*, Butl. = *Chloroclystis palpata*, Hampson, may probably be an Eastern Asian representative of this species.]

LOBOPHORA HALTERATA, Hufn. = *hexapterata*, Schiff.

Occurs in Amurland and Yesso. Typical.

LOBOPHORA (TRICHOPTERYX) VIRETATA, Hb.

Mr. Leech has one female specimen from Ta-chien-lu, Western China; taken in May.

ASTHENA (HYDRELIA) SYLVATA, Hb.
Euchœca sylvata, Meyr.

Occurs in Amurland and Japan. Typical.

ASTHENA (HYDRELIA) BLOMERI, Curtis = *pulchraria*, Eversm.
Euchœca blomeri, Meyr.

Recorded from Amurland and Japan.

Mr. Leech refers to one specimen, from Pryer's collection, in which "the only character that shows up at all prominently is the short brownish fascia."

ASTHENA (HYDRELIA) LUTEATA, Schiff.
Euchœca luteata, Meyr.

There were two specimens in Pryer's Japanese collection, and these Mr. Leech states are paler than his European examples.

The species also occurs in Amurland and the Isle of Askold.

ASTHENA CANDIDATA, Schiff.

Occurs in Amurland, Japan, Yesso, Corea, Central and North-east China. Typical.

EUPISTERIA (HYDRELIA) OBLITERATA, Hufn. = *hepararia*, Hb.
Euchœca obliterata, Meyr.

Recorded only from Japan. Typical.

VENUSIA CAMBRICA, Curtis.

Occurs in Japan. Typical.

MINOA MURINATA, Scop. = *euphorbiata*, Fb.
Asthena murinata, Meyr.

Mr. Leech has one male specimen from Japan. This is referable to var. *cyparissaria*, Mann.

Subfamily ACIDALIINÆ.

ACIDALIA ORNATA, Scop.
Craspedia ornata, Meyr.

This species is found in Amurland and Japan. Mr. Leech remarks that "the blotches on outer area of the wings are less distinct in Japanese than in European specimens."

ACIDALIA STRIGILARIA, Hb.
Leptomeris strigilaria, Meyr.

Common in Japan; also occurs in Amurland, Kiushiu, Corea, Central, Western, and Northern China.

ACIDALIA FUMATA, Steph.
Leptomeris fumata, Meyr.

Occurs in Amurland, and Mr. Leech states that there was a specimen in Pryer's Japanese collection which he considered referable to this species.

ACIDALIA REMUTARIA, Hb.
Leptomeris remutaria, Meyr.

Recorded from Amurland and Japan.

ACIDALIA STRIGARIA, Hb.
Leptomeris strigaria, Meyr.

Occurs in Amurland, Japan, and Corea.

ACIDALIA BISETATA, Hufn.
Eois bisetata, Meyr.

Has been found in East Siberia, Amurland, Japan, Kiushiu, Corea, Central, Western, and North-eastern China.

TIMANDRA AMATARIA, Linn.
Calothysanis amataria, Meyr.

"Very variable and generally distributed throughout Japan." It also occurs in Central and Western China.

Subfamily GEOMETRINÆ.

PSEUDOTERPNA PRUINATA, Hufn. = *cytisaria*, Esp.

Alphéraky describes as var. *simplex* a large greenish white form without markings from Western China.

Hemithea strigata, Müll.
Nemoria strigata, Meyr.

Occurs in Amurland, Japan, Yesso, Kiushiu, Corea.

Geometra papilionaria, Linn.

Occurs in East Siberia, Amurland, Japan, and Yesso. Typical.

Nemoria viridata, Linn.

Has been recorded from Amurland and Corea, and Mr. Leech refers specimens received from Central and Western China to this species.

Iodis (Thalera) lactearia, Linn.
Euchloris lactearia, Meyr.

Occurs in Amurland, Corea, Yesso, and North-eastern China.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from vol. xxx. 312.)

Hypsipetes trifasciata, *Bork.* — Although the alder is so common a tree in all parts of Ireland, this species, so far as my experience goes, appears to be somewhat localized. It presents the usual wide range of variation, sometimes with a dark green ground colour (*W.*); but I have not met with the almost unicolorous brown form. A very remarkable variation I have from Drumreaske and near Favour Royal, Tyrone, has a whitish ground colour with very little dusting of dark scales, traversed by two slight scalloped lines across the central and basal areas. The fringes are dusky, and on the costa one or two dark marks, indicating other suppressed transverse bars. Judging from the rather small Irish series I possess, the Irish insect seems to tend toward pale rather than dark forms. Localities: The Rev. J. Greene found pupæ under moss on alder-trees at Rathfarnham, Co. Dublin (*B.*); Powerscourt, Co. Wicklow, abundant; Howth (*G. V. H.*); Favour Royal, Co. Tyrone; Drumreaske, Co. Monaghan; Enniskillen (*A.*) and Tempo Manor (*Langham*); Cromlyn, Co. Westmeath (*Mrs. B.*); Sligo (*Russ.*); Derry, abundant (*C.*); Colin Glen, &c., near Belfast, very numerous (*W.*); Castle Bellingham, Co. Louth (*Thornhill*).

Hypsipetes sordidata, *Fb.* — One of our most abundant moths, and as variable here as elsewhere in the United Kingdom. Only one of the ab. *fusco-undata* has come under my notice, from Farnham, Cavan. The var. *infuscata*, Stgr., has not yet been recorded from Ireland. At Altadiawan, Tyrone, I took a number of the larvæ, nearly full-fed, from bilberry (*Vaccinium myrtillus*), and reared them on that food; but the imagines were in no way remarkable, except for their somewhat inferior size, a result which might have occurred through irregularity in feeding.

Melanthia bicolorata, *Hufn.*—Generally distributed and in many places very numerous, as at Ardtully, near Kenmare, Tempo Manor, near Enniskillen (*Langham*), and at Enniscoe, Crossmolina, Co. Mayo. The chief variation is shown in the median band, which is often not developed except in a large costal blotch. This sometimes is connected with a small one on the inner margin by a dot or two; and rarely specimens occur with the band complete from margin to margin. The var. *plumbata* has not yet been observed. "Dublin and Wicklow, not uncommon" (*B.*); Glenarm, common (*W.*), and Antrim; L. Neagh and Armagh (*J.*); Derry (*C* and *W. E. H.*); Carrablagh (*G. V. H.*), Cloghan and Stranorlar, Co. Donegal; Favour Royal, Tyrone; Enniskillen (*A.*); Castle Bellingham, Co. Louth (*Thornhill*); Cromlyn (*Mrs. B.*) and Killynon (*Miss R.*) Co. Westmeath; Greystones, Co. Wicklow; Clonbrock, Co. Galway, common (*R. E. D.*); Mallow, Co. Cork (*Stawell*).

Melanthia ocellata, *L.*—Widely spread and not rare. No important varieties have been observed. The apical area and the white extra-basal band vary in the amount of marking, and there is often a warm ochreous tinge on the outer marginal white band. It is unnecessary to give localities, as it occurs in most districts, though not often very numerous.

Melanthia albicillata, *L.* — This handsome insect is far more local than the preceding, and though generally somewhat scarce, is in some woodlands fairly numerous. Its distribution is very extensive. It varies greatly in expanse, from about one inch to one and three-eighths, but no variation of any importance occurs, though the shading along the outer margin differs in degrees of strength. "Wicklow, Kerry, and Galway" (*B.*). In the latter county it is found at Kilcornan, Ardrahan (*Miss N.*) and Kylemore (*Hon. E. L.*); Donard demesne, &c., Co. Down (*W.*); Derry (*W. E. H.*); Stranorlar, Co. Donegal; Markree Castle, shores of L. Arrow, and near Sligo (*Russ*); Cromlyn (*Mrs. B.*) and Killynon (*Miss R.*), Co. Westmeath; Drumreaske, Monaghan; Favour Royal, Co. Tyrone; Armagh (*J.*); Enniscorthy, Co. Wexford; near Kenmare and Crookhaven, Co. Kerry; Cappagh, Co. Waterford; Mallow, Co. Cork (*Stawell*).

Melanippe hastata, *L.*—Local, but often fairly plentiful in its haunts. Somewhat variable; the median black band and that along the outer margin being sometimes much broken up and attenuated. The general Irish form has the white median band of both wings broad, rarely bearing a series of spots, but usually devoid of them or with only a few traces, and sharply defined by the black bands. Occasional aberrations occur with the type, however, in which the basal halves of the wings are white, ornamented by black spots and irregular streaks in place of the usual black band; and the black marking on the outer margin much diminished. The small Scottish forms from Sutherland, Isle of Lewes, &c., and also from Yorkshire, in which the white bands are reduced in size and bear a well-marked series of spots (as represented in the second illustration in Newman's 'British Moths'), has not yet been noticed in Ireland. Our small examples tend, like the rest, to an increase of the white pattern. This northern variety appears to be the var. *subhastata*, Nolck., of Sven Lampa's Cat. Scand. Lep. A variety even more obscured by black than the above was sent me from Scandinavia, in which the basal halves of the wings are black with interrupted white lines, and the white median band as narrow as that of the smaller species, *M. tristata*, and heavily spotted. In fact, with a larger expanse, its character approximates closely to the latter species, and appears to be a transitional form, and may be referable to var. *gothicata*, Gn. Thus it would appear that a well-marked gradation of characters is developed under the influence of northern climates; so that this species seems worthy of more attention than it has yet received from students of melanic phenomena. Irish specimens, however, bear a distinctly southern impress. Killarney (Toomies and Cromaglaun), Kenmare, Sneem, and elsewhere in Kerry, fairly plentiful; Ballyvourney and Macroom, Co. Cork; Kylemore (*Hon. E. L.*), Ballynahinch, Merlin Park, Clonbrock, Ardrahan, &c., Co. Galway; Sligo (*W.*); common near Tempo Manor, Enniskillen (*Langham*); Altadiawan, Tyrone; Kilderry (*C.*) and Buncrana (*Milne*), near Derry; and I have met with it in great numbers at Pontoon, on the shore of L. Conn, Mayo.

Melanippe tristata, *L.*—A very local species, though numerous in its haunts. Irish specimens have the black bands of the basal half of the wings pale, and generally much broken up with white; and the white transverse band broad. A Scandinavian specimen in my cabinet has the basal half of the wing deep black, traversed by two white striæ, and the outer marginal black band very broad and dark, with a few white spots. I have a few similar English examples. A curious aberration from Powerscourt, Wicklow, has all the white ground suffused with rusty yellow, and the black markings very pale and broken up. Tinahely (*Bw.*), Kippure and Powerscourt, Co. Wicklow; Claring Bridge (*B.*), Kylemore (*Hon. E. L.*), and Ardrahan, Co. Galway; Enniskillen (*A.*); mountain above Tollymore Park, Knockagh, near Carrickfergus (*W.*); Cappagh, Co. Waterford.

Melanippe unangulata, *Haw.*—Very local and uncommon. Belfast (*Bw.*); Enniskillen, one (*Col. Partridge*); Cappagh, Co.

Waterford; Clonbrock, a few (*R. E. D.*); Ardtully and mountains above Kenmare, Co. Kerry.

Melanippe rivata, *Hb.*—Very rare and local. I have never taken it. "Cork, Mr. Clear" (*B.*); Clonbullogue, King's Co. (*E. S.*); Galway, a few (*A.*).

Melanippe sociata, *Bork.*—One of our most numerous Geometers, unstable in its character, especially in the width of the white submarginal band, and the outline and colour of the dark median band.

(To be continued.)

A LIST OF THE HYMENOPTERA-ACULEATA OF THE IPSWICH DISTRICT.

By Claude Morley, F.E.S., &c.

The collection of the Aculeates was never a very strong point with me until my friend Rev. E. N. Bloomfield, M.A., F.E.S., proposed drawing up a list of those species which occurred in the county of Suffolk, and I then did what I could to assist him in so congenial a study, in view of the shortly expected publication of which I can say but little here without poaching upon his preserves. The cradle of Anthophilology was rocked in this District by Rev. William Kirby, M.A., F.R.S., &c., rector of Barham, just a hundred years ago, and, in setting forth my own experience side by side with his, I think the contrast will but show that, when Entomology as a whole was hardly shortcoated, this pioneer was already a "man among men." This being so, it is hardly wonderful that within a radius of five miles of Ipswich town more species should be enumerated, thanks to him, than have been recorded in some cases from a whole county. One or two of these, however, have not been observed within seven miles, and a couple of the *Megachile* occur no nearer than Felixstowe, which is ten as the crow flies. These, however, are the only exceptions. That there are species, especially among the Fossores, at this moment disporting themselves upon the blackberry blossoms and luscious Umbelliferæ, carrying spiders and caterpillars to their nests in sand-banks, posts, and dead twigs, that have not their names enrolled in this list, there can be no doubt; but, since it is an obvious impossibility to include the whole, and the list is now (I think) as long as others of the same scope, it would appear that this classic corner of East Anglia is to be anything but despised as a hunting-ground for these the most intelligent insects; and we trust that the following list may induce some of our lepidopterists also to embrace this exceedingly interesting branch, and those who have never handled the subtle net to go out into the highways and hedges and "look through Nature up to Nature's God."

Excluding races and varieties, the list comprises the following species:—Heterogyna, 10; Fossores, 53; Diploptera, 10; Anthophila, 133. Total, 206.

HETEROGYNA.

FORMICA, Linn.

1. *rufa*, Linn.—There has been a strong nest in the Bentley Woods for the last six years, and at one time there were two, in which many myrmecophilous Coleoptera occur.
2. *fusca*, Linn.—Generally common on sandy banks.

LASIUS, Fab.

3. *fuliginosus*, Latr.—Barham, abundant (*Rothney*); common, often hibernating beneath oak bark.
4. *niger*, Linn.—The common garden ant; abundant.

,, race *alienus*, Först.—Common on the sandhills at Felixstowe in June.

5. *umbratus*, Nyl.—Not uncommon; Barren and Foxhall Heaths.
6. *flavus*, De Geer.—Nests commonly in old pastures.

LEPTOTHORAX, Mayr.

7. *tuberum*, Fab., race *nylanderi*, Foerst.—Somewhat local, but very common in the winter beneath the bark of aspen, maple, &c.; Wherstead, Bentley, Blakenham, &c.; by the Gipping at Claydon, &c.

STENAMMA, West.

8. *westwoodi*, West.—One specimen in moss from Bentley Woods, 30 × 97.

MYRMICA, Latr.

9. *rubra*, Linn., race *ruginodis*, Nyl.—Not uncommon.

,, ,, *lævinodis*, Nyl.—Common.

,, ,, *scabrinodis*, Nyl.—Common.

,, ,, *lobicornis*, Nyl.—Rare; one hermaphrodite in sandpit at Foxhall, August, 1896.

MONOMORIUM

10. *pharaonis*, Linn.—An imported species; only too common in a baker's shop in Ipswich; also swept from hedges at Wherstead.

FOSSORES.

MUTILLA, Lyn.

11. *rufipes*, Ltr.—Rare; a couple of females at Bentley Woods in August, 1897.

MYRMOSA, Latr.

12. *melanocephala*, Fab.—Singly; always in sandy places; Bentley Woods, male and female; Bixley and Foxhall, females.

TIPHIA, Fab.

13. *femorata*, Fab.—Ipswich and Barham (*Rothney*).

AGENIA, Schiödte.

14. *hircana*, Fab.—Rare; one swept near Clopton Church, July, 1897.

SALIUS, Fab.

15. *fuscus*, Linn,—Not uncommon in the spring.
16. *exaltatus*, Fab.—Sparingly since 1893.
17. *pusillus*, Schiödte.—Rare; in the spring in Bentley Woods.

18. *parvulus*, Dhlb.—One female in a sandpit at Bentley Woods, August, 1896.

Pompilus, Fab.

19. *plumbeus*, Fab.—Not uncommon at Bixley in August.
20. *chalybeatus*, Schiödte.—Rare; Foxhall, and at Felixstowe, flying on the sands.
21. *gibbus*, Fab.—Belstead, Foxhall, Ipswich, and Bentley Woods, singly.
22. *unguicularis*, Thoms,—Uncommon; Wherstead and Foxhall in 1896.
23. *pectinipes*, V. d. Lind.—The commonest of the genus,and widely distributed.

Trypoxylon, Latr.

24. *figulus*, Linn.—Not very common.
25. *clavicerum*, Lep.—Abundant; the genus is always taken flying to their nests in posts.
26. *attenuatum*, Sm.—Uncommon; Dodnash Wood and Clopton.

Tachytes, Panz.

27. *pectinipes*, Linn.—Rare; one on Umbelliferæ, Ipswich, 1896.

Ammophila, Kirb.

28. *sabulosa*, Linn.—Sparingly since 1893.
29. *hirsuta*, Scop.—Martlesham Heath (*Kirby*).
30. *lutaria*, Fab.—Martlesham Heath, two females (*Kirby*).

Stigmus, Jur.

31. *Solskyi*, Moraw.—Rare; one at Great Bealings, flying to nest in post.

Diodontus, Curt.

32. *tristis*, V. d. Lind.—Common; flying to nests in sandbanks; Grandisburgh, Bentley Woods, &c.

Passalœcus, Shuck.

33. *cornigera*, Shuck.—Common.
34. *insignis*, V. d. Lind.—Common in woods about Bentley.
35. *gracilis*, Curt.—Rare; at flowers on the banks of the Gipping.
36. *monilicornis*, Dbm.—Both sexes flying to nests in palings; Ipswich, June 22nd, 1896.

Pemphredon, Latr.

37. *lugubris*, Fab.—Rare; Bentley Woods.
38. *shuckardi*, Moraw.—Not common on the banks of the Gipping and at Foxhall.

Mimesa, Shuck.

39. *bicolor*, Jur.—One only; on umbels at Bentley Woods, in 1894.

Gorytes, Latr.

40. *tumidus*, Panz.—Local; Bramford, Foxhall, and Bentley Woods.
41. *mystaceus*, Linn.—Uncommon; Bentley Woods and Blakenham.

Nysson, Latr.

42. *spinosus*, Fab.—Taken by Mr. Baylis and myself at Bentley Woods in 1894, but not seen in the District since.
43. *dimidiatus*, Jur.—Rare; Bentley Woods and Foxhall, singly.

Mellinus, Fab.

44. *arvensis*, Linn.—Common.

Cerceris, Fab.

45. *labiata*, Fab.—Singly at Baylham, Bentley Woods, Bramford, and Little Blakenham, on *Spiræa ulmaria* and *Achillea millefolium*.

Crabro, Fab.

46. *capitosus*, Shuck.—Ipswich; bred from bramble stems (*Rothney*).

47. *leucostoma*, Linn.—Rarely; at Bentley Woods and Great Blakenham.
48. *podagricus*, V. d. Lind.—Flying, like the rest of the genus, to posts in which they nest, at Ipswich and Great Bealings.
49. *palmipes*, Linn.—Not uncommon; Ipswich, Foxhall, Clopton, and Great Bealings.
50. *varius*, Lep.—Rare; a single specimen in Bentley Woods.
51. *wesmaeli*, V. d. Lind.—Rarely; on umbels at Ipswich.
52. *elongatulus*, V. d. Lind.—By no means common; Foxhall, &c.
53. *4-maculatus*, Fab.—Common; about here it burrows in sandpits, and not in rotten wood (Saunders's 'Hymenoptera,' p. 137).
54. *cribrarius*, Linn.—Common.
55. *peltarius*, Schreb.—Common.
56. *vagus*, Linn.—Very rare; one at a sandbank, Dodnash Wood.
57. *cephalotes*, Panz.—Not very common; Ipswich and Grundisburgh.
58. *chrsyostoma*, Lep.—Somewhat common.
59. *lituratus*, Panz.—One specimen on umbels near Ipswich in 1894.
60. *albilabris*, Fab.—Occasionally on flowers at Ipswich.

ENTOMAGNATHUS, Dhlb.

61. *brevis*, V. d. Lind.—Common.

OXYBELUS, Latr.

62. *uniglumis*, Linn.—Common.

DIPLOPTERA.

VESPA, Linn.

63. *crabro*, Linn.—Not too common; a strong nest in a garden in the Westerfield Road, Ipswich, in 1894.
64. *vulgaris*, Linn.—Common, and harbouring many species of inquiline Coleoptera in its nests, e. g. *Metæcus paradoxus*, *Haploderus cælatus*, *Rhizophagus ferrugineus*, *Cryptophagus pubescens*, &c.
65. *germanica*, Fab.—Common.
66. *rufa*, Linn.—Not common; Bentley Woods and Hadleigh.
67. *sylvestris*, Scop.—Somewhat common.

ODYNERUS, Latr.

68. *callosus*, Thoms.—Somewhat common.
69. *parietum*, Linn.—Rare; one in my study, June 30th, 1897.
70. *trifasciatus*, Oliv.—Rare; one near Ipswich in June, 1896.
71. *gracilis*, Brullé.—Rare; a female on *Spiræa ulmaria* at Baylham.
72. *sinuatus*, Fab.—The commonest of the genus, curiously enough; an old gate-post in Bentley Woods generally harbours a large colony.

ANTHOPHILA.

COLLETES, Latr.

73. *succincta*, Linn.—Rare; Foxhall Crag Pits.
74. *fodiens*, Kirb.—"Barhamiæ, in floribus Jacobeæ" (*Kirby*); Rushmere (*Harwood*); common on ragwort at Foxhall.
75. *picistigma*, Thoms.—Rare; a female at Bentley Woods in 1897.
76. *daviesana*, Sm. — Abundant at nests in a sandbank, Bentley Woods, &c.

PROSOPIS, Fab.

77. *dilatata*, Kirb.—Barham (*Kirby*).
78. *communis*, Nyl.—Barham (*Kirby*); common.
79. *signata*, Panz.—Barham (*Kirby*).
80. *confusa*, Nyl.—One on *Rubus* flowers in Bentley Woods.

81. *brevicornis*, Nyl.—One on Umbelliferæ in Bentley Woods, 1896.

SPHECODES, Latr.

82. *gibbus*, Linn.—Barham (*Kirby*); not common; Bramford and Great Bealings in 1897.
83. *subquadratus*, Sm.—Not uncommon; Great Bealings, Bentley Woods, &c.
84. *pilifrons*, Thoms.—Somewhat common on *Achillea millefolium*.
85. *similis*, Wesm.—Common.
86. *puncticeps*, Thoms.—Uncommon; Foxhall and Bentley Woods.
87. *dimidiatus*, v. Hag.—The commonest of the genus, and ubiquitous on flowers in August.
88. *affinis*, v. Hag.—Not uncommon.

HALICTUS, Latr.

89. *rubicundus*, Chr.—Barham (*Kirby*); common on flowers.
90. *xanthopus*, Kirb.—Barham (*Kirby*).
91. *leucozonius*, Schr.—Barham (*Kirby*); common on flowers.
92. *quadrinotatus*, Kirb.—Barham (*Kirby*); common.
93. *lævigatus*, Kirb.—Barham (*Kirby*).
94. *sexnotatus*, Kirb.—Frequent in flowers at Barham in the autumn (*Kirby*).
95. *cylindricus*, Fab.—Barham; frequent (*Kirby*); very common.
96. *albipes*, Kirb.—Barham (*Kirby*); rather common.
97. *subfasciatus*, Nyl.—Probably rare; two specimens on flowers in the Bramford marshes in August, 1897.
98. *villosulus*, Kirb.—Barham, very rare (*Kirby*); uncommon, Little Blakenham.
99. *lævis*, Kirb. — "Barhamiæ semel capta, iterum in Nacton, Suffolciæ" (*Kirby*); the only British records — about a hundred years old!
100. *minutus*, Kirb.—Barham (*Kirby*); uncommon, Clopton, Bramford, and on the banks of the Orwell.
101. *nitidusculus*, Kirk.—Barham (*Kirby*) abundant, the commonest species of the genus in this district.
102. *punctatissimus*, Schk. — Very rare; one female on flowers at Foxhall, May, 1897.
103. *minutissimus*, Kirb.—Frequent on flowers and roadside banks at Barham (*Kirby*); not very common.
104. *tumulorum*, L.—Barham (*Kirby*); common of flowers of *Achillea millefolium* in August.
105. *smeathmanellus*, Kirb.—Many nests in a low wall surmounted by an iron railing in the Burrell Road, Ipswich; it also occurs at Bramford and Burgh.
106. *morio*, Fab.—Barham (*Kirby*); not very common; Bentley, and on the banks of the Orwell.
107. *leucopus*, Kirb.—Abundant on flowers in July and August.

ANDRENA, Fab.

108. *cetii*, Schr.—"Barhamiæ; Coddenhamiæ, prope Needham Market in Suffolciâ, bis capta" (*Kirby*).
109. *cingulata*, Fab.—"Barhamiæ, femina in floribus Ranunculosi bulbosi" (*Kirby*); very rare, one on umbels in 1894.
110. *albicans*, Kirb.—Barham (*Kirby*); common.

111. *pilipes*, Fab.—Barham (*Kirby*).
112. *atriceps*, Kirb.—"Barhamiæ, in floribus Taraxaci" (*Kirby*); not uncommon on flowers in April.
113. *bimaculata*, Kirb.—Twice taken at Barham (*Kirby*); common.
114. *florea*, Fab.—One female at bramble-flowers in Bentley Woods on Aug. 3rd, 1896.
115. *rosæ*, Panz.—Uncommon; Bentley Woods and Foxhall.
var, *trimmerana*, Kirb.—Very common.
116. *thoracica*, Fab.—Barham (*Kirby*).
117. *nitida*, Fourc.—Frequent at Barham (*Kirby*); East Bergholt (*Harwood*).
118. *fulva*, Schr.—Barham (*Kirby*); common; Shrubland Park, &c.
119. *clarkella*, Kirb.—Rare; Ipswich; only taken in 1894.
120. *nigroænea*, Kirb.—Barham (*Kirby*); somewhat common, appears in April.
121. *gwynana*, Kirb. (1st brood).—Barham (*Kirby*); abundant in April at flowers of *Leontodon*, &c. Kirby's dedication is interesting:—"Memoriæ botanici periti, tum et naturæ, scrutatoris indefessi, mihi et omnibus Historiæ Naturalis cultoribus semper amicissimum se præbentis, Nicolai Gwyn, M.D. Gippovicensis, hoc insectum dicatum volo."
bicolor, Fab. (2nd brood).—Much rarer than the first brood; Foxhall, &c.
122. *angustior*, Kirb.—"Mas Barhamiæ lectus" (*Kirby*).
123. *præcox*, Scop.—"Barhamiæ, in salicum amentis masculis frequens anno 1799" (*Kirby*).
124. *varians*, Rossi.—"Capta semel in floribus P. Mali in horto quodam Gippovicensi" (*Kirby*).
125. *helvola*, Linn.—Barham (*Kirby*).
126. *nigriceps*, Kirb.—Barham in 1800 (*Kirby*); not uncommon at Bentley Woods.
127. *denticulata*, Kirb.—Rarely in flowers at Barham (*Kirby*).
128. *fuscipes*, Kirb.—Barham; very rare (*Kirby*); still very rare, one specimen at Ipswich in 1893.
129. *tridentata*, Kirb.—Melton and Barham; very rare (*Kirby*).
130. *fulvicrus*, Kirb.—Infrequent at Barham (*Kirby*).
131. *albicrus*, Kirb.—Barham (*Kirby*); uncommon, Foxhall and Ipswich.
132. *chrysosceles*, Kirb.—Barham; rare (*Kirby*); uncommon, Ipswich and Blakenham.

(To be continued.)

NOTES AND OBSERVATIONS.

Heliothis armigera.—This species is a true cosmopolitan. It occurs in Europe, Asia, Africa, America, and Australia. It was first introduced as British by Mr. Edleston, who in the 'The Zoologist' for 1843 (p. 260) recorded a specimen taken at Salford, by Mr. John Thomas, in September, 1840. This capture is referred to in the list of "New British Species since 1835," published in the 'Entomologist's

Annual' for 1855 (p. 38), where also are mentioned a specimen taken at Mickleham, and others "taken in various localities." In 1856 one was obtained at Exeter, and one in the Isle of Wight. The summer of 1859 was a hot one, as were the two previous summers, and many records of the occurrence of *H. armigera* were enumerated in the 'Annual' for 1860; the localities being Brighton, Bristol, Cambridge, Edmonton, Isle of Wight, Ramsgate, Torquay, Weston-super-mare, Worthing, and other places. Between the year last mentioned and 1871 one specimen or more seem to have been captured each year, and chiefly on the south and south-west coasts, but one example was reported from Scarborough in 1866, and one from Wakefield in 1871. Turning now to the 'Entomologist' I do not find any further records until 1876, when a specimen occurred at Bristol, and in the following year three captures were announced—one at Hartlepool, one in Gloucestershire, and one on the Kentish coast. In 1881 there is another Gloucestershire record; in 1890 the occurrence of a specimen at Chatham is reported; in 1895 one example is notified from Tunbridge Wells; and, finally, we have the capture mentioned by Mr. Druitt in the present number. Mr. J. Jenner Weir, in 1869, bred two specimens from larvæ found feeding on tomatoes, and mentioned, when exhibiting them before the Entomological Society of London, that an importation of tomatoes from Spain and Portugal had been greatly damaged by a number of green larvæ, with black lines and spots, which fed in the fruit.

Twenty-three years later Mr. Arkle (Entom. xxv. 237) again refers to the importation of *H. armigera* in the larval state in consignments of tomatoes from Valencia arriving at Liverpool in the months of June and July. The moths in this case appeared on July 27th (two) and Aug. 15th (one). The same writer (Entom. xxvii. 138) records two imagines, bred July 9th, from larvæ obtained from Valencia tomatoes in June, 1893; in 1896 he received about twenty full-grown larvæ in June, and one on Sept. 24th, the latter imported from Lisbon, but the others from Spain. Probably the majority of the specimens of the species captured in this country arrive here in the larval state, but it is quite possible that occasionally the insect may pass through the whole of its metamorphoses on British soil. Mr. Golding Bird states (Entom. ix. 261) that in the autumn of 1876 he found some larvæ on the flower-heads of scarlet geranium in the Isle of Wight. They were very numerous, and varied greatly in colour, but as he did not know to what species they belonged, and thinking that they would produce some common moth, he only secured about half a dozen. These were injured in the journey to London, and he reared but one imago on August 1st.

In the United States, where it is known as "Cotton-boll worm," "Corn-ear worm," and "Tomato-fruit worm," *H. armigera* has the reputation of being destructive to the cotton crop, the estimated damage ranging in the different States from two to something like fifteen per cent. Probably, however, it is more injurious to corn, as there are five generations in the year, and the first three of these occur in cornfields more especially. Besides corn, cotton, and tomato, the larva affects beans, tobacco, pumpkins, melons, garden flowering plants, and also various wild plants. The species has been the object of special investigation by entomologists appointed for the purpose, and several bulletins dealing with the matter have been issued by the U. S. Department of Agriculture, Division of Entomology.—RICHARD SOUTH.

EPIONE PARALLELARIA IN SCOTLAND.—In a collection of Lepidoptera made by Mr. W. Salvage in Sutherlandshire, in 1892, was a fairly long series of *Epione parallelaria* (*vespertaria*); referring to which he says, to use his own words, "I not only captured *vespertaria*, but bred it from larvæ found on aspen and sallow at Invershin, Sutherlandshire; I also took the moth in North Ross. The species is pretty well distributed in Sutherlandshire, and occurs from sea-level to about a thousand feet on the mountains. Aspen is, I believe, a new food-plant." The specimens appear to be somewhat brighter in coloration than the York examples; this apparent difference may, however, result rather from the particular individuals compared, than from any general tendency to local variation. These records, taken in conjunction with the recent captures reported from Roxburghshire, suggest the probability of a distribution over a very considerable portion of Scotland.—ROBERT ADKIN; Lewisham, Dec. 11th, 1897.

VENILIA MACULARIA IN SCOTLAND.—In the same collection there was also a long series of *Venilia macularia*, sufficiently long indeed to suggest that the species had been met with in some abundance. In several of the individuals comprised in it, the black blotches are larger than is usual in the South English examples.—ROBERT ADKIN.

CONCERNING VARIETIES OF EPINEPHELE IANIRA, L.—Hofmann in his book, 'Gross-schmetterlinge Europas,' makes no mention of under-side variation in *E. ianira*, although he describes corresponding varieties of *E. hyperanthes*. The recognized named forms of *ianira* given in Staudinger's list No. 40 are var. *hispulla*, var. *fortunata*, var. *telmessia*, and var. *kurdistana*. In considering specimens of *ianira* from the same neighbourhood, it is found that they differ from one another in the number and position of the spots on the under side of the hind wings, some males having two, three, four, five, and even six spots, while occasionally one finds an individual with these spots entirely absent. The following table shows the proportion of each form in sixty-four male specimens taken near Sofia during June and July, 1896:—

Number of spots on the under side of hind wings	0	1	2	3	4	5	6
Number of specimens ...	1	0	36	19	6	1	1

Thus it is seen that more than half of these male *ianira* from Sofia have only two spots on the hind wings; one-third possess three spots, and one-tenth four; the other forms are rare, while none have yet been taken with one spot only. The example without the white dots on the hind wing had the ocellus of the fore wing reduced to a mere point. In the case of the female the number of spots appears to range from one to three, while a much larger proportion, *viz.* fifteen out of twenty-six, have no white ocelli in the hind wings. The colouring of the ninety specimens examined exhibited every gradation, from typical *E. ianira* to var. *hispulla*.—PROF. P. BACHMETJEW in 'Societas Entomologica,' xii. 8.—(W. M.)

A Gynandromorphous Platisamia cecropia. — Mr. Carl Frings ('Societas Entomologica,' xii. 1) records the capture of a gynandrous specimen of *P. cecropia* in the spring of 1896. The insect is completely divided by a line passing down the centre of the body into male and female, but it is interesting to note that the genitalia are typically male.—(W. M.)

CAPTURES AND FIELD REPORTS.

Plusia moneta.—Mr. Charles E. Morris, of Vernon Lodge, Preston, near Brighton, informs me, in a letter dated the 12th inst., that he and Mr. Tucker captured eleven specimens of *Plusia moneta* on *Delphinium* in their garden at Preston in July last. He adds that they also found two pupæ of the species.—H. Goss; The Avenue, Surbiton Hill, December 16th, 1897.

Noctua dahlii and Triphæna orbona = subsequa in South Oxfordshire.—Though belated, it may be interesting to record the capture of *Noctua dahlii* on August 1st, 1896; and one specimen of *Triphæna orbona = subsequa* on July 30th, and another by Mr. Hamm on August 2nd, 1896. These species have not hitherto, I believe, been recorded from the Reading district.—J. Clarke; Reading, Dec. 13th, 1897.

Heliothis armigera in 1897.—On 21st October last I captured a specimen of this moth at ivy bloom in this neighbourhood.—A. Druitt; Christchurch.

Notes from North Wales, 1897.—In January *Phigalia pedaria* and *Hybernia rupicapraria* were abundant at light. A month later *H. marginaria* occurred freely; but *Anisopteryx æscularia* and *H. leucophæaria* were each represented by a single specimen. The latter seems to be scarce in our neighbourhood. In March *Tæniocampa stabilis*, *T. incerta*, *T. gothica*, and *T. pulverulenta* were common at sallows; while *T. munda* occurred in abundant variety. I noticed that it was the first of its genus to appear commonly. Of *Xylocampa areola* I boxed a good series off palings. Butterflies were later here than in 1896. The first specimens I saw of *Euchloë cardamines* (May 9th) were very small males, averaging about 1⅓ in. in expanse. The ova and larvæ of this insect were to be found very freely during June and July on *Cardamine pratensis* and *Alliaria officinalis*. Two specimens of *Gonepteryx rhamni* were seen on June 5th; the first I have noticed in this district. *Argynnis euphrosyne* is one of our commonest butterflies; it is found nearly everywhere in the valleys or low wooded hills of the county. For *Melitæa artemis* I have discovered two localities, where it occurs very sparingly, and of the ordinary type. The common Pierids were much scarcer than usual. *Argynnis aglaia* is another generally distributed butterfly here, but I have not found it abundant at any time. *Satyrus egeria* I have never seen here; *S. megæra* is very scarce. Of the blues I have taken only *Lycæna icarus* (common) and *L. argiolus*, which I have found in several directions. *Vanessa c-album* I saw but once, May 9th; *V. io* was considerably in evidence during May and June.

Turning to the Heterocera again, in May I got a pair of *Smerinthus ocellatus* in my garden. Later in the month I took seven specimens of

Macroglossa fuciformis (the narrow-bordered bee-hawk) over flowers of *Orobus tuberosus*, and saw others. *Numeria pulveraria* occurred frequently; but other Geometers, abundant last year, were very scarce this: among these were *Odontopera bidentata* and *Anaitis plagiata*. In June *Grammesia trigrammica* was very abundant at light, along with *Hadena dentina* and *Leucania comma;* and a few *Cilix spinula*. I took three *Agrotis cinerea* again at light, all males and all rather worn; they occurred on May 31st and June 4th.

On Whit-Monday we found *Ematurga atomaria* and *Melanippe tristata* swarming on the Clôg, a hill some five miles off. From the middle to the end of June moths swarmed at sugar. On June 30th I counted over two hundred Noctuæ on one patch about three feet long by eighteen inches broad. *G. trigrammica* and *Agrotis exclamationis* were very abundant during the first part of that period. Of the latter I took one fine variety similar to the lower figure in Newman's 'British Moths.' As the month advanced *Agrotis segetum*, *Xylophasia monoglypha*, *X. lithoxylea*, and *Triphæna pronuba* grew commoner. Among other moths that occurred less freely were *Miana strigilis* (in great variety), *Rusina tenebrosa*, *Acronycta psi*, *A. rumicis*, *Chariclea umbra* (one only), *Aplecta nebulosa*, *Noctua festiva*, *N. triangulum*, *N. augur*, *Mamestra anceps*, aad *Apamea basilinea*. On June 29th I missed a fine specimen of *Cymatophora octogesima* at sugar. On June 20th I found a number of larvæ of *Liparis* (*Porthesia*) *chrysorrhœa*, which produced a fine series of "brown-tails" in July.

Two days in mid-June we spent at Dinas Mawddwy. *Bupalus piniaria* swarmed in the pine woods there, along with *Macaria liturata*, *Larentia pectinitaria*, and *Thera obeliscata*. At rhododendron bloom we took a series of *M. stellatarum;* while every flower seemed to harbour two or three specimens of *Eupithecia pulchellata*.

Cucullia umbratica was common at light throughout June. *Atrata chærophyllata* I have found in most of our hill country. During July we netted *Pseudoterpna cytisaria* and *Metrocampa margaritaria*, *Cidaria pyraliata* *C. fulvata*, *Crocallis elinguaria*, and lots of the commoner species of *Melanippe*.

August and part of September I spent in Somersetshire. Since returning here insects have been very scarce. I never remember so barren an autumn. We had during September and October a long spell of dry weather, with a succession of northerly and easterly winds. Add to this the fact that ivy is scarce in our neighbourhood, and such unusual absence of even common moths can be explained to a certain extent.

I took but two specimens of *Anchocelis pistacina*, and one of *Miselia oxyacanthæ;* last year they were very abundant at light. *Cheimatobia brumata* completes my record; it is still most consistent in its plentiful appearance.—Alfred S. Tetley; Llwynon, Newtown, N. Wales.

SOCIETIES.

Entomological Society of London.—*December* 1*st*, 1897.—Mr. R. Trimen, F.R.S., President, in the chair. Mr. Hope Alderson, of Hilda Vale, Farnborough; Mr. Arthur Horne, of Ugie Bank, Aberdeen;

Mr. Charles H. Pemberton, of 4, Kent's Terrace, Torquay; and Mr. E. P. Stebbing, Indian Forest Service, were elected Fellows of the Society. Mr. Dudley Wright exhibited an aberration of *Argynnis euphrosyne*, in which the upper side was suffused with black, and the silver spots of the under side of the hind wing converted into streaks. On behalf of Mr. W. H. Tuck, Mr. Tutt showed examples of *Metœcus paradoxus*, L., taken in nests of *Vespa vulgaris* near Bury St. Edmund's, together with some of the cells in which they were found. About a fifth of the nests examined were affected, some containing as many as twenty-four, twelve, and eight examples of the beetle; the more usual number present was from two to four. The dates between which examples were taken in 1897 were from Aug. 2nd to Oct. 1st. Acccording to Dr. Chapman, the eggs were laid in the cracks of posts, &c., from which the wasps got the pulp to make their cells. Combs were also exhibited from nests of *Vespa crabro* and *Vespa germanica*, in which Mr. Tuck had found larvæ of *Velleius dilatatus*, Fabr., which, however, he had been unable to rear. The Rev. A. E. Eaton exhibited a specimen of the singular *Myodites subdipterus*, Fabr., taken by himself at Biskra, Algeria, and a near ally of *Metœcus*. Mr. Blandford called attention to a new instance of the destructive propensities of *Dermestes vulpinus*, Fabr. He had received examples found at Hong-Kong among flags made of bunting, which were presumably injured, although no details had been forwarded. This form of injury was analogous with the damage to woodwork recorded by himself and others; it had nothing to do with the feeding-habits of the insect, but was committed by the larvæ in their search for shelter in which to pupate. Probably the flags had been stored at some period in the neighbourhood of infested leather goods, or dried provisions. The only other case of damage to textile fabrics by *Dermestes vulpinus* which he knew of occurred in connection with the case recorded by him (Proc. Ent. Soc. Lond. 1890, p. xxxi); a blue handkerchief spotted with white, left in the infested building, was found next day to have all the white spots eaten out. In the ensuing discussion Mr. C. G. Barrett referred to the damage done by Agrotid larvæ to linen spread out to bleach on the hillsides near Belfast. Investigation showed that this did not take place except when the linen was gathered up and brought into the warehouses without being shaken. The caterpillars which had taken shelter underneath it then ate their way through it, in order to escape in search of food. Mr. Champion communicated papers entitled "Notes on American and other Tingitidæ, with Descriptions of two new Genera and Four Species"; and "A List of the Staphylinidæ collected by Mr. J. J. Walker, R.N., in the Straits Gibraltar."—W. F. H. Blandford, *Hon. Sec.*

South London Entomological and Natural History Society.—*November* 25*th*, 1897.—Mr. R. Adkin, F.E.S. President, in the chair. Mr. Tunaley exhibited xanthic specimens of *Epinephele ianira*, taken in North Kent in 1896; a variable series of *Angerona prunaria*, from the same locality; and, on behalf of Miss Miller, of Chelmsford, an unusual variation of *Acronycta rumicis*, having a distinct red tinge on the submarginal area of the wings, some portions of the body being similarly tinted. Mr. H. Moore, a small collection of Lepidoptera, taken in France last August, while on a cycling tour, and contributed notes.

E. ianira, generally, and *Erebia æthiops* and *E. neoridas*, locally, were the only species seen at all commonly. Chambéry was the farthest point reached. Mr. Bristowe, a small collection of Lepidoptera taken during a short visit to Japan. It was remarked how close many of the species were to those of our own country, but much larger. Mr. Tutt, a bred series of *Cnethocampa pityocampa* from larvæ taken by Dr. Chapman in the South of France, and remarked on the considerable sexual dimorphism; also a specimen of *Eriogaster catax*, from the same locality. Mr. Adkin, an asymmetrical specimen of *Arctia caia*, in which the left fore and hind wings were much suffused with the dark brown colour, the right wings being normal. The specimen was one of a second brood, and emerged from pupa in October last.

December 9*th*.—The President in the chair. Col. Partridge exhibited specimens of *Ephyra trilinearia*: (1) female parent, typical; (2) specimen of brood from above, dwarfed, very red, and annulated; (3) specimens of same brood which stood over in pupal stage. The last were not so red, nor dwarfed, and the annulated spots could only just be traced. Mr. McArthur, a box of varieties captured or bred this year, including *Arctia caia*, yellow; *Abraxas grossulariata*, radiated and coalescent; *Bombyx rubi*, with the transverse lines lighter and wider than usual, and others. Mr. Mera, a box of *Abraxas grossulariata*, bred at Forest Gate in 1897, separable into two distinct groups, a light and a dark one. Mr. Montgomery, specimens of *Smerinthus ocellatus* and *Cossus ligniperda*, which had been extremely affected by grease, and which were admirably cleansed, even to the fringe of the abdomen, by the use of benzine collas and a blowpipe. Mr. Clark, a photo-micrograph of a mite which, with numerous others, he had found on a humble-bee. Mr. Adkin, series of *Epione parallelaria* (*vespertaria*) from Sutherland, and specimens of *Abraxas grossulariata*; in the latter the usual yellow markings were of a dull ochreous; they were bred by Rev. Joseph Greene, of Clifton. Rev. Joseph Green sent drawings of some seventy varieties of *Abraxas grossulariata*, bred during the last six years near Bristol, and communicated notes on the same. Mr. Turner, eight species of the genus *Libythea*, and read notes on their relationships, characteristics, and distribution. It was announced that Part I. of the Proceedings was published, and ready for distribution.—Hy. J. Turner, *Hon. Report. Sec.*

Birmingham Entomological Society.—*November* 15*th*. Mr. G. T. Bethune-Baker, President, in the chair. Mr. R. C. Bradley, *à propos* of Mr. Kendrick's paper on mimicry, read at the last meeting, exhibited a few examples of mimicry amongst Diptera: *Volucella bombylans* in both its forms, with *Bombus lapidarius* and *B. terrestris*, and *V. inanis*, with its host *Vespa crabro*. Mr. C. J. Wainwright also exhibited a number of examples of mimicry among Diptera, arranged in groups, showing a number of species mimicking *Apis mellifica*, another lot showing a general wasp-like type, and another lot closely resembling *Bombus muscorum*, &c. Mr. A. H. Martineau showed a similar lot of examples: *Chilosia flavicornis*, with an *Andrena* with which it flies in the spring, when few other large insects are about, and which it very closely resembles; *Arctophila mussitans* and *Criorrhina oxyacanthæ*, both of which, the former especially, so closely resemble *Bombus muscorum*, that they are frequently taken for bees, and the real species not discovered till it is in the net; *Merodon equestris*, which not only resembles *Anthophora furcata*, but flies in exactly the same manner, and has a similar characteristic, a high-pitched note. He also showed the species of *Psithyrus*, with their hosts *Bombus lapidarius* and *B. terrestris* (female), which they resemble very closely, undoubtedly for protective purposes, and probably to enable them to enter the nests of their hosts unobserved, as their entrance is frequently disputed when detected. Mr. G. T. Bethune-Baker showed a species of *Arhopala* mimicking *Danis appolonius*, a widely different Lycænid.—Colbran J. Wainwright, *Hon. Sec.*

RECENT LITERATURE.

The Lepidoptera of the British Islands. By Charles G. Barrett, F.E.S. Vol. iv., pp. 404. London: L. Reeve & Co. 1897.

In the present volume we have a further instalment of the Noctuina, in which ninety-eight species, comprised in thirty genera, are considered.

It is satisfactory to note that Mr. Barrett has not found it desirable to make any very striking changes in the arrangement or generic nomenclature of this family. He has, however, adopted *Eurois* for *occulta*, *prasina* (*herbida*), *adusta*, and *porphyrea* (*satura*). The first-named is the type of *Eurois*, Hübn., and *prasina* appears to be congeneric with it, but it is probably not quite correct to include *adusta* and *porphyrea* in this genus. *Popularis* is usually assigned to *Neuronia*, Hübn., but our author places this species, together with *cespitis*, in *Heliophobus*, and removes *hispidus* to *Ulochlæna*. *Abjecta*, *sordida* (*anceps*), and *furva* are referred to *Hama*, and there seems to be no objection to this; but it is curious to note that Mr. Meyrick includes all three of these species in *Hadena*. Sir George Hampson (Fauna Brit. Ind. Moths, ii. p. 198) merges *Mamestra*, Ochs., and *Neuria*, Guen., in *Hadena*, Schrank, established in 1802 (Fauna, Boica, ii. 2, p. 158), and gives *cucubali*, Schiff. [Fues.] as the type. Mr. Barrett retains *cucubali* in *Dianthœcia*, and Mr. Meyrick includes it in *Harmodia*, Hübn. (= *Dianthœcia*, Auct.). *Aprilina* is placed in *Chariptera*, Guen., and this would seem to indicate that it is considered congeneric with *culta*, Fabr., the type of the genus. *Dryobota* adopted for *protea* appears to be a more suitable genus for the species than either *Polia*, to which it is referred by Mr. Meyrick, or *Hadena*, in which it is included by several authors; probably, however, its really correct position would be in *Eurois*.

At the present time both classification and nomenclature are in a state of transition, and it will probably be many years hence ere anything approaching finality in these matters is attained. In the meantime the student must be prepared to find in future works on British Lepidoptera many more indications of the changes in progress than those we have referred to as occurring in the volume under notice. We do not say this in disparagement of Mr. Barrett's work; on the contrary, we consider that he has done wisely in keeping closely to the old track.

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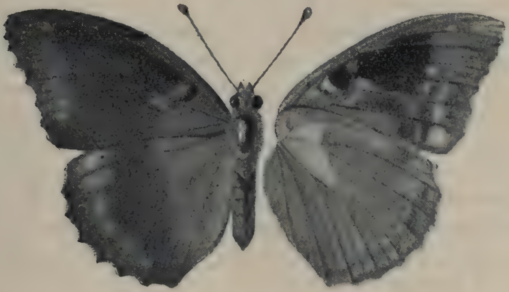
ARGYNNIS PAPHIA VAR. *VALESINA* AB.



I AM obliged to Mr. Sabine, of Erith, for the loan of the highly interesting aberration of the *valesina* form of *A. paphia* figured above. The specimen, which was taken in the New Forest last year, was purchased at Stevens's auction rooms last December.

Although described in the catalogue as a male, the insect is certainly a female *valesina*, and the ground colour is that proper to the form, but rather deeper in tint than usual, and much suffused with black. The aberrant character of the markings is well shown in the figure.

I may mention that Mr. Leech has a very similar example in his collection. This specimen was received, among others of the normal *valesina* form, from Chang-Yang in Central China.

In the 'Entomologist's Monthly Magazine' for January there is a figure of an almost parallel aberration of *A. paphia*, which is also a female, and was captured in Northampton last July by Mr. Kenneth J. Morton. A male specimen of the same form, taken by Mr. W. J. Argent in the New Forest in July, 1881, is figured in the 'Entomologist,' xv. pl. 1, fig. 4; and in an article on "Aberrations in the genus *Argynnis*," in the same volume, the late Mr. J. Jenner Weir, referring to this example, states that "another similarly but not so strongly marked" was obtained at the same time and place.

RICHARD SOUTH.

TEPHROSIA CREPUSCULARIA (*BISTORTATA*) = *T. BIUNDULARIA.*

By J. Arkle.

Last season I devoted a large amount of time and attention to the *Tephrosia* question, and as my experience contributed in a great measure to the opinion I now hold that *T. crepuscularia* (*bistortata*) and *T. biundularia* are one and the same species, I venture to think that what I have to say upon the subject may be of interest to the readers of the 'Entomologist.' First, let it be assumed, but only for the sake of clearness, that *T. crepuscularia* (*bistortata*) is the double- or even treble-brooded insect, and that *T. biundularia* has only one brood of imagines in the season.

I had a regular farm of Tephrosias—hundreds of eggs, hundreds of larvæ, and many imagines — from Perthshire, Cheshire, Derbyshire, Yorks, Berks, Essex, Somersetshire, Devonshire, Hants, and Sussex. These kept me in such constant watchfulness, that at no time was I able to leave home for more than a couple of days in succession. Besides all this I had a correspondence which may justly be described as voluminous. On all these heads my thanks are due to those who so kindly helped me, and, in addition, my apologies whenever I appeared in the part of the importunate.

Much has been said of the egg, and I therefore brought all my powers to bear on this initial stage of the insect. I may say, at this point, that my observations throughout were simplified by the use of a powerful lens and an excellent binocular microscope. Neither in size, shape, or colour could I distinguish between the egg of *T. crepuscularia* (*bistortata*) and *T. biundularia*. That marvellous faculty of variation, which is such a character of the insect in all its stages except that of the chrysalis, was almost as much in evidence in the egg as in either larva or imago. Sometimes one, sometimes the other, had the advantage in size, greenness, or as regular or irregular ovals or, if you like, cylinders with rounded ends. Fourteen laid by a Delamere Forest female were the palest. Quoting from my note book, I find them described (May 10th) as "pale, dull straw-colour, very nearly that of the chip box on which they were laid. Their shells have a very faint iridescent green, only visible under a strong lens." As a rule the eggs were enveloped in a whitish "fluff" or down, but even this feature was inconstant. It was Dr. Riding who discovered this "silk" to be "contained in a pouch at the extremity of the abdomen, in the form of dense bundles about 2 mm. long, and resembling, in miniature, locks of wavy flaxen hair. Hitherto all such coverings were supposed to consist of scales from the anal segment" (Entom. Record, ix. 130).

It is in the larva state where variation is most conspicuous, but always in the matter of colour. The constant characters are (1st), *structural*, as a general snakelike appearance increased by lateral swellings of segments 3 and 4, particularly segment 3; slightly raised and notched appearance, dorsally, of segments 3 and 12, the notches being raised tubercles, each emitting a short hair. (2nd), *constant colour markings*, as a pale blotch, whitish, yellowish, or reddish above and upon the claspers of segment 10; and black, oblique, dorsal marks on segment 12, almost forming a V, pointing anally and terminating in the notches. *Constant colour markings up to the final stage* are segments 6, 7, 8, darker, dorsally, than the rest, and a V-shaped black mark on segment 6 similar to that on segment 12, but pointing towards the head. The V-shaped mark was most constant, even including the final stage, in New Forest larvæ (*crepuscularia* = *bistortata*). In other matters of coloration, as the stripes, or traces of them, there was constancy enough; all else was chaos, from light hazel with darker shades, to dark reddish brown with darker blotches. Thus the dark or oblique marks on segment 12, ending in the notches or tubercles, are really the anal terminations of the sub-dorsal dark stripes, and the pale marks above and on the claspers of segment 10 are really the terminations of the broad, yellowish (but blotched with reddish, &c., and so interrupted) mid-side stripe. Of course there is always the faint dorsal stripe, which is usually lost in the dark dorsal areas of segments 6, 7, 8, and sometimes 9. (See Entom. xxx. 140). The palest larvæ, taking them as a whole, were the Somerset *crepuscularia* (*bistortata*); the darkest, those of Delamere Forest (*biundularia*). A scarce form of the latter is as black as ink, except in the ever-present pale (in this case whitish) blotch above and upon the claspers of segment 10. I put six of these in a pot by themselves, to see if the resultant moths turn out to be the black variety taken by Mr. Hargreaves in March, 1896 (Entom. xxix. 216; xxx. 142). If so, I hope to propagate the breed.

Some time ago I was showing my collection to a veteran entomologist who, I know, will read these remarks. We came to these Tephrosias, and he asked, "Do you believe they are distinct species?" "Of course," said I; "don't So-and-so, and So-and-so, *and* So-and-So believe it!" "Well, then," he asked, "what are the points of difference?" Whereupon I ran out a formula, which I will not quote, as I now believe there was nothing in it. It was a formula inherited, but, among the many things entomological, never examined. Never shall I forget the veteran as he politely observed, "I am sure I ought to be obliged for all this information!" So I determined to make up my own mind upon the *Tephrosia* question, and I have done so. Whether the moths be ochreous, black, or "bone-white" in general colour, whether they be faintly marked or banded, to me they will be henceforth *T. crepuscularia*. Other opinions shall have my respect, as in duty bound,—"I bend my back and bow my head," as they sing in 'Dorothy.'

I will not weary the reader, or trespass upon the indulgence of our editor, by appending a copy of a table which lies before me, showing dates of hatching, pupation, or emergence of the various Tephrosias committed to my charge. I will rather summarise, and the general conclusion I arrive at is this: if these Tephrosias appear early enough to lay eggs which hatch in March, April, or even as late as the first few days of May, the climatic conditions, local environment, and acquired habit may permit a second, third, and, I should not be surprised, a fourth brood of imagines. On the other hand, if they appear so late that the eggs do not hatch before the end of May or beginning of June, there will, as a rule, be only one brood. A second emergence of York *biundularia* was represented by a male of "bone-white" ground colour on Sept. 8th, while those of Delamere Forest showed a male of the local type on Aug. 19th, and a female at the end of November, the larvæ being reared and the pupæ kept behind a high wall facing north, in the open. And who shall say that the six moths I took, June 13th, 1891, in Delamere Forest, were not representatives of a second brood! They were fresh insects, and I obtained eggs from them (Entom. xxiv. 287). Surely here is evidence of a common trait or character! Anyhow, no one would think of separating moths into species because *here* there is only one brood in the season, and *there* two; if so then the *Plusia festucæ* of Bolton (Entom. xxix. 113) is a different species to the *Plusia festucæ* of Chester. Again, second and third brood imagines (bred) of *crepuscularia* (*bistortata*) were fewer at Chester than, for example, in Somerset and Hants; that is, as they became exposed to colder conditions and less favourable environment. Somerset gave me, without extenuating circumstances, a second brood of five moths from three dozen larvæ; Hants, a third brood of nine from one hundred and forty-four larvæ; the rest of the pupæ are, in each case, lying over the winter. It was in this attempt to arrive at general conclusions that I met my greatest difficulty. I could not fit a communication from a valued correspondent into the chain of evidence. At last, on comparing the date with the postmarks, I found him, accidentally of course, two months out!

The concluding part of my inquiry into the two Tephrosias deals with matters entirely microscopic. It is without weight either for or against identity; the value of x equals nothing! But, to naturalists, anything under the microscope is so enchanting that "we lose and forget the creeping hours of time." Such must be the excuse for presenting my experience to the reader. Dr. Beale, in his 'How to work with the Microscope,' p. 29, says:—"The best light during the day is to be obtained from a white cloud upon which the sun is shining." And, again, "Direct sunlight is not to be employed, and a very strong light of any kind is hurtful to the eyes." Under this advice I set to work on a brilliant July day, my sitting lasting six hours, to see if there could be any difference between the wing-scales of *crepuscularia* (*bistortata*) and *biundularia*. The lenses used were chiefly ½ in. for individual examination, and 1½ in. for viewing "the field." And how can we best examine, microscopically, the scales of an insect? Take a glass slip, 3 in. by 1 in.; breathe upon it, and press gently but firmly an upper and lower wing of the set specimen on the part of the slip breathed upon; lift the wings (the moth is as good as ever) and you will just see a little patch of dust on the slip. This is a facsimile of the wings, consisting of scores upon scores of scales. Place the slip on the stage of the microscope, and adjust the instrument to suit your sight. Then take pencil and paper and *sketch what you see*, for memory cannot be trusted in these matters. Never did transformation scene equal the sight you behold! In the sun—for we *will* do the thing we ought not to do—and with a 1½ in. lens, the scales glisten like burnished silver. We are looking at "a field" of them. They are all perfectly distinct in outline, but the sight is too much for mortal eye, so we choose the light from "a white cloud," and the silver becomes mother-of-pearl, with all sorts of prismatic colours. Still deeper we go with the ½ in. lens, and the scales are seen to have a central vein or nervule, with close, parallel, but dotted lines throughout their entire length. With this lens I made out the dots to be little depressions with raised centres—but here I speak from memory.

The shape of the predominant wing-scales* on *crepuscularia* (*bistortata*) AND *biundularia* is exactly like that of the blade of a scull broken off near the top of the shaft. The end, or termination, however, is prominently toothed. These teeth may be two in number—in which case they are of equal length—three, four, or five, and then the central one, two, or three of them are longer than the others. A rarer form is the well-known "battledore" scale, and a still rarer one has the outline club-shaped. The longer fringe-scales (cilia) are, perhaps, the most beautiful of all. Some are shaped like a blade of grass, but the majority are deeply serrated or toothed at the extremities—a sketch before me shows four, another six, serrations—in fact, the cilia are perfect miniatures of the petals of a pink. The discovery of a fresh scale, of course, meant testing the whole of the specimens over again until it was found in all. This multiplied my labours, which did not end until the 30th of October.

Summarising, then, I found all the Tephrosias, including *consonaria*, *luridata* (*extersaria*), and *punctulata*, had scales of the same pattern. In *T. punctulata* I came across one with seven notches or serrations; another with nine. But I must confess I was hardly prepared to find that *the wing-scales of all moths*, as far as I could see, were of similar design. But so it is, and I append a list of additional species I examined:— *Boarmia consortaria*, *Uropteryx sambucaria*, *Angerona prunaria*, *Phigalia pedaria* (*pilosaria*), *Hemithea strigata* (*thymiaria*), *Acidalia aversata*, *Halia vauaria* (*wavaria*), *Ematurga atomaria*, *Abraxas grossulariata*, *Hybernia marginaria* (*progemmaria*), *Anisopteryx æscularia*, *Anaitis plagiata*, *Tanagra atrata* (*chœrophyllata*), *Melanippe montanata*, *Coremia unidentaria*, *Cidaria corylata*, *Pyralis farinalis*, *Eurrhypara urticata* (*urticalis*), and *Heliothis armigera*.

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* Their length = breadth × 3.

Chester: Jan. 7th, 1898.

"*DEILEPHILA GALII* OF 1897."

By the Rev. A. Miles Moss.

To those who were interested in the article on the re-appearance of *Deilephila galii* (Entom. xxx. 290) on the Lancashire and Cheshire coast, I have thought that it may be of further interest to state final results. I therefore briefly append the sequel.

Though too late on the scenes, it will be remembered that I was fortunate in procuring four larvæ. One of these I preserved, the remainder pupating more or less satisfactorily. I say *more or less* because the specimen given to me by the greenkeeper at Wallasey, owing, as I take it, to the rather rough handling which it received just at the critical period, became slightly malformed in the pupa, having a deep indentation between head and thorax. One of the remaining two, found at Waterloo, in pupating failed to lay its right antenna case in its appointed socket, this remaining in a curved position over the leg cases.

These three pupæ, together with six pupæ of *Chærocampa porcellus* and one *Macroglossa stellatarum*, I placed in a flower-pot filled with sand and gravel, and kept moist continually by a saucer of water, and the pupæ were all placed in a vertical position in holes in the sand, the heads only appearing. The pot was covered with a piece of muslin, and left on the kitchen range, in which position it sometimes attained an almost frightening temperature, the thermometer varying from about 50° F. (*i.e.* at night) to between 115° and 120° when the fire was hot, and I feared that my poor *galii* would be cooked alive! Past experience, however, in forcing other pupæ has convinced me that they can stand an almost incredible amount of heat so long as it be accompanied with moisture.

This forcing operation began on Oct. 20th. By Nov. 12th I could see that the malformed specimen was forming, and on Nov. 15th it endeavoured to emerge, but, though the notch behind the head did not seem to hinder the process of transformation, yet the insect became a cripple from another cause, the spiracle tissues apparently being too strong to release the abdomen from its case. Perhaps this was due to excess of moisture, or to a too quick development.

From some other unknown cause the well-formed pupa died about Nov. 30th, and I feared that my success with *galii* was to be limited to a slight increase of experience, not the most happy.

However, on Dec. 6th a specimen of *C. porcellus* emerged satisfactorily, and to my great joy the third and last *galii* also emerged satisfactorily on Dec. 19th, a perfect, though not very large, male; the slight malformation of the antenna case apparently having no detrimental effect to its contents.

All my *M. stellatarum* have already emerged without forcing, with the exception of the one experimented upon, which succumbed under the unwonted treatment of heat and moisture.

It will thus be seen that all have been subjected to the same conditions with varying results of failure and success, and I should much like to know why it is that one month's forcing should affect one insect, while another should require twice that period; why, under the circumstances, one should live and another die. Truly nature's ways, though full of interest, are past finding out.

Since writing the above, another perfect specimen of *C. porcellus* has emerged,—January 14th,—having required nearly three months of this irregular system of forcing to complete its transformation.

107, Camden Street, Birkenhead: Dec. 22nd, 1897.

SYNOPSIS OF THE NORTH AMERICAN BEES OF THE GENUS *NOMIA*.

By T. D. A. Cockerell, N. M. Agr. Exp. Sta.

Mr. William J. Fox in 1893 ('Ent. News,' p. 134) gave a synopsis of the North American species of *Nomia*, including, however, only four species. One of these he described as new under the name *N. punctata*, but this name being preoccupied in the genus, Dalla Torre altered it to *N. foxii*. In the present synopsis ten species are included. One other species is known from the western hemisphere—*N. tarsalis*, Westw., from Brazil. The species of *Eunomia*, Cr. (not *Eunomia*, DC., a genus of Cruciferæ), viz. *E. apacha*, Cr., *E. marginipennis*, Cr., and *E. heteropoda*, Say, are excluded.

Nomia, *Latr.*

Purple-blue, head and thorax with fulvous hair. (Mexico) . . . . *cælestina*, Westw.

Apical margins of abdominal segments greenish or greenish white . . . . 1.

Abdomen ferruginous, or ferruginous and black, apical margins not greenish . . . *nevadensis*, Cress.

Abdomen black, apical margins not greenish . . 4.

1. Size large, 17 mm. or over; apex of hind tibiæ of male not emarginate . . . . *nortoni*, Cress.

Size medium, less than 15 mm. in length . . 2.

2. "Dorsal abdominal segments of female subopaque, not punctate, but feebly roughened or granulated; apex of hind femora of male widely emarginate."—Fox, *l. c.* (Cuba) . *robinsoni*, Cress.

Dorsal abdominal segments distinctly punctured 3.

3. "Clypeus smooth." (Eleuthera, Bahamas) . *wickhamii*, Ashm.

Clypeus well punctured . . . . . *foxii*, Dalla Torre.

4. Pubescence sooty-black, abdomen shining. (Brazil, Mexico) . . . . . . *kirbii*, Westw. MS., Smith.

Pubescence pale . . . . 5.

5. Tibiæ of male ferruginous, tegulæ amber-colour *bakeri*, n. sp.

Tibiæ of male black . . . . 6.

6. Tarsi of male reddish testaceous. (Canada) . *compacta*, Prov.

Tarsi of male black . . . . . *persimilis*, Ckll., ined.

Nomia foxii, D. T.

Fox records this from Colorado, New Mexico, and S. Dakota. Specimens are before me which were collected by Prof. C. H. T. Townsend at Turkey Tanks, Arizona, July 17th and 18th. The male, not known to Fox, differs little from Ashmead's description of *wickhamii*. The hind femora are thickened; the hind tibiæ triagonal, greatly enlarged distally, testaceous, with a black blotch on each face, and the outer apical corner black; the hind tarsi with the basal joint testaceous and flattened. Flagellum ferruginous beneath.

Nomia bakeri, n. sp.

♂. Length not quite 10 mm., black, strongly and closely punctured; pubescence short, dull white, tolerably dense on face, pleura, and post-scutellum, forming narrow bands on the apical margins of the abdominal segments. Flagellum with a dark ferruginous tinge beneath. Wings dusky yellowish, apical margin broadly smoky; stigma ferruginous, nervures dark brown; tegulæ transparent amber-colour; femora black, anterior femur with a ferruginous stripe in front, hind femora incrassate, the basal half dark ferruginous; tibiæ ferruginous, hind tibiæ broadened to apex, but not so much modified as in *N. foxii*; tarsi ferruginous, hind tarsi mostly black except at base. The face is broader below than in *N. foxii*, and the punctures of the first two abdominal segments are very different, being small and clear; these segments have conspicuous transverse depressions.

Hab. Colorado (C. F. Baker, 1591). Taken at flowers of *Solidago canadensis*, at Fort Collins, Aug. 8th, 1895.

Nomia persimilis, Ckll., ined.

The female occurs at Albuquerque, N. M., in company with *Andrena helianthi*, to which it has a remarkable superficial resemblance. The male is larger than *bakeri* (about 13 mm. long), and has black legs and light testaceous tegulæ. The punctuation of the male abdomen is small and close as in *bakeri*, but the hair-bands are thin and weak, scarcely deserving the name of bands. Flagellum black; face quite broad. Also found at Lincoln, Nebraska (L. Bruner), and in the Mesilla Valley of New Mexico. The female visits the sunflower in September.

P.S., Dec. 31st. — I have just received from M. J. Vachal an interesting paper on the genus *Nomia*. He describes *M. triangulifera* from a single male taken in Kansas: this new species is evidently very close to my *N. persimilis*, and may even be identical with it. He also re-describes *N. cressoni*, Westw., 1875; and it certainly seems probable that the name—generally regarded as a synonym of *nortoni*—belongs to a distinct species inhabiting Mexico.—T. D. A. Cockerell.

Mesilla, New Mexico, U.S.A.: Dec. 24th, 1897.

DRAGONFLIES IN 1897.

By J. Arkle.

I had intended continuing my season's experience among the dragonflies upon the lines of my previous notes (Entom. xxx. 250). However, the capital paper by Mr. Lucas, *l. c.*, p. 277, together with the admirable illustrations, tempts me to consider the subject of greater importance, and to treat it separately.

By woody brooks in "the flowery month of June" *Calopteryx virgo* may frequently be met. It is by no means common about Chester, but I saw half-a-dozen on the wing in June and July. A couple of these were sporting over some rushes on the margin of the Dee near Eaton Hall. Worthenbury, however, some twelve miles higher up, is the great home in the district for this handsome dragonfly. There it may be seen in scores.

Wanting a series of *Pyrrhosoma minium* for a correspondent, I made a couple of close searches in the two haunts known to me in Delamere Forest about the end of June, but at neither place was it in evidence! The fact was, the character of both localities had changed during the last few years. They were drier,—the Scotch firs and birches had grown up, overshadowing the ground, and *P. minium* had disappeared. So it is with other insects than dragonflies; over-collecting, no doubt, has much to answer for, but, let an insect's habitat be transformed,—for example, if a marsh, let it be drained,—and the place thereof shall know it no more.

There is a large pond away in the depths of the Delamere woods which I have often come across when seeking for the early spring moths. It looks as though its margins had once been cared for, as if some one had thought of making its banks a dwelling-place, had even set about it, and then left it to its silent loneliness. I put it down as a likely place for dragonflies, and so June 24th found me thither bound. But I could not find it, do as I would. The whole neighbourhood looked changed in its garb of ferns and green leaves; the pond was hidden, and I could not get a sight of it. So I gave it up for the time, took my bearings from the sun (a trick taught by sad experience), and made my way to some marshy, ditchy, unfrequented ground. There I came across *P. minium*, as I had never met with the species before, in hundreds.

I think *Æschna juncea* has not been as plentiful with us as in other seasons; but *Æ. grandis* was quite up to its usual numbers. The excessive heat and drought dried up many of *juncea's* ponds and marshes, while the deeper pits of *grandis* survived. What an interesting dragonfly *Æ. grandis* is,—how voracious, and almost nocturnal! Hold him by the wings, and he will coolly bite anything from a nail down to cotton-wool. He will bite your finger if you present it to him, but without animosity. His ruling passion is simply something to eat. I have frequently tried his biting powers, but my epidermis always turns his mandibles; and I have not yet persuaded anyone thinner skinned to submit to the experiment. As to his nocturnal habits, I saw one hawking along a hedge in the deep twilight of a still, warm August night,—date, August 6th; time, 8.30. The rising moon was just above the horizon, showing its light on the fleecy clouds and on the white mist hanging over the meadows. One day in August I found *grandis* and *juncea* flying together over a dried-up river-bed in North Wales; on the adjacent woody heights *juncea* was alone. *Grandis*, in fact, prefers the lower grounds. The last I saw of *juncea* for the season was on August 21st; of *grandis* on the evening of September 4th,—time 7 o'clock, very dusk, and the city lamps lit.

On August 14th *Ischnura elegans* appeared again, fresh and fine, at a pond where it had not occurred since May; surely a second brood?

On August 21st I found *Libellula quadrimaculata* and *Leucor-*

rhinia dubia over on the Delamere heaths. The place of the latter was taken by lots of *Sympetrum scoticum.* One afternoon in July, just as the sun was getting near the horizon and I was facing west for home, I came across numbers of *L. quadrimaculata* resting on the tops of the heather. Unlike *Æ. grandis*, they retire early. There they were, at varying intervals, with their wings spread out and glistening, for all the world like distant windows in the setting sun. Far away, for a long distance on the heath, I could easily make them out.

My last dragonfly hunt at Delamere was on August 21st, when I went in quest of *Lestes sponsa*, a charming insect with its bronze green, chocolate bronze, and cobalt blue,—and all fast colours! The day was unfavourable,—showery-looking, and with a strong south-west wind. I stirred up two or three; but I was indebted to another romance for the lot I netted. When about tired out, we spied, miles away to the south-west and just on the sky-line, a bit of black cloud. This represented a drenching shower rattling along as fast as an express train. "Now, my friend," said I, "we shall have to go all round the marsh before we reach those trees on the other side only fifty yards off us in a straight line, and we shall meet the shower! But stay! let us try crossing the marsh itself, which here appears dried up." Away we go where, possibly, foot rarely crossed before! Let the crust give way, and down we go full fathom five! But we are across, the sun still shines, and *L. sponsa*, sheltered by the wood, is on the wing in hundreds. A glance at the nearing shower shows that we have beaten it hollow, and with several minutes to spare. These are made good use of, and, as we settle down behind fern and heather and under leafy canopy, we pin out our *sponsa* from the cyanide-bottles while the storm raves and splashes overhead.

As it appears that many of the brethren are taking up this fascinating group, let me presume to offer a word or two of advice on setting. Set your dragonflies on the flat. Abhor the "saddle." For when did any dragonfly—I had almost said any insect—ever curve its wings! Let the grooves be wide enough to admit the legs and thorax. Let them be deeply corked and then papered,—the paper just high enough in the groove so that the top of the thorax is on a level with the board. Use black pins. I use Kirby, Beard & Co's. No. 4 for large, and No. 9 for small dragonflies. Let the pins stand perpendicularly. Lift up the wings and set the legs first, the paper in the groove will show them up well. Next set the wings with card-braces and paper; the upper slanting a trifle upwards, the lower a little downwards. Then see that the body is perfectly straight. Last, but not least, set the head, not looking waggishly to the right or left, or despondingly down, but straight and flat on the paper.

Chester: November 9th, 1897.

A NEW SETTING-BOARD.

By Geo. O. Day.

To those lepidopterists who are dissatisfied with the ordinary method of setting, and their name ought to be legion, it may be of some service if I made generally known, through the pages of the 'Entomologist,' a setting-board of my own contrivance, that I have used for the last seven or eight years with very satisfactory results, both as regards the insects set and the time taken in setting.

The main difference between my boards and those ordinarily used lies in the substitution of glass for the card-board or tracing-paper braces. I understand that loose pieces of glass are used by some entomologists on the Continent, and probably also at home, but the advantage in my contrivance is that the pieces of glass are hinged on to the sides of the boards.

A glance at the accompanying illustration will give a general idea of the method.

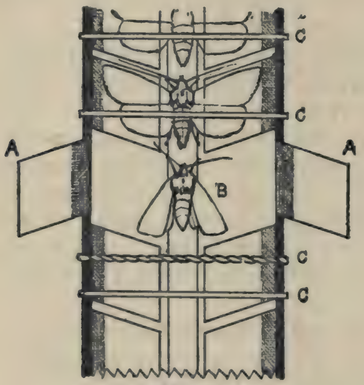


Fig. I.

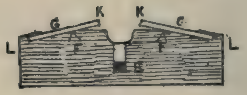


Fig. II.

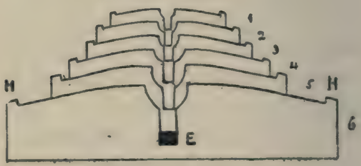


Fig. III.

I will first describe the *modus operandi*, and afterwards give some particulars of the construction of the board. I may mention that the present form is the result of eight years' trial and improvements.

Method of Setting.

The pair of little glass "shutters" are thrown open as shown at AA, Fig. I. (a stout needle with about half an inch of the point end bent at right angles and fixed in a handle is the best kind of instrument to use). The moth or butterfly is then pinned into the groove. In a properly relaxed insect some parts of the wings will naturally lie on the surface of the board, as at B, Fig. I. The glasses are then turned back into their original position, but now they will be covering some part of the wings, and are held down by a small elastic string-band. (These bands are marked C.) The glass on one side must then be levered up by the little implement before mentioned, just sufficient to admit of the wing being moved up into its place by an ordinary setting-needle. When the wing is in its right position the glass must be allowed to rest on it to hold it in its place. The under wing is next treated in the same manner, only care must be taken that the upper wing does not slip back during the process. The other side of the insect is then dealt with. A great advantage of the glass is that the operator can see to make the two sides perfectly symmetrical.

Both hands must of course be used in the operation—one to lever up the glass, and the other to move the wing into position.

Description of Board.

The materials used are wood, glass, paper, strip of cork, two strips of fine muslin or other thin material, and glue.

The boards are made of wood, and are papered on the surface, including the rounded part of the central groove. A strip of cork is inserted at the bottom of the groove (E) to receive the pin on which the body of the insect is placed. This groove must be made of a depth to suit the taste of the setter (see observation at the end). The shape of the surface of the board is a very important matter, both as to the curve it is intended the wings are to take, and the flatness of the surface where the glasses (GG, Fig. II.) impinge upon the wings; the flatness must of course extend far enough for the glasses to impinge upon the under wings as well (points FF, Fig. II.). The glasses themselves extend beyond these points, in fact nearly to the body groove (to KK, Fig. II.).

There is a narrow raised beading of wood (HH, Fig. II.) at the two sides of the board, of the thickness of the glass, and to this beading the pieces of glass are hinged, by glueing on a strip of muslin or other thin material (LL, Fig. II.). Paper will do, only it is not so durable.

It will be found convenient to leave a small space between each pair of glasses, in order to arrange the antennæ with a moist camel's-hair brush after setting the wings.

The glasses are pressed to the board by a narrow elastic band placed over each pair. These bands entirely encircle the board, and are moved backwards off the glasses and forwards on to the glasses again, by rolling.

For the guidance of any one who wishes to make this kind of board the diagram (Fig. III.) is given. The sizes—*viz.* width of board and relative depth of groove—are those which by experience are found to be most useful. And the contour of the surface is recommended for those who adopt the curved style of setting.

I do not presume to do more than suggest the shape as a sightly one of its kind, and the height serviceable; but is it too much to hope that we shall ever have a "standard" shape and a "standard" height of setting? What a difference it would make in the appearance of our collections if we had!

[All the drawings kindly furnished by Mr. Day were actual size, but for the purpose of reproduction here they have been reduced about one-half.—Ed.]

Knutsford: December, 1897.

A LIST OF THE HYMENOPTERA-ACULEATA OF THE IPSWICH DISTRICT.

By Claude Morley, F.E.S., &c.

(Concluded from p. 17.)

Andrena, Fab. (contd.)

133. *coitana*, Kirb.—"This has been taken only by my ingenious friend, the Rev. James Coyte, of Ipswich, by whose name I have called it [A D. J. Coyte, entomologo Gippovicensi, mihi, transmissa], and whose cabinet contains many other very rare insects" (*Kirby*, who, however, also records it under the name *shawella*, from Barham); Bentley Woods, August, 1895.

134. *fulvago*, Chr.—Barham; frequent on flowers in grassy places July, 1799 (*Kirby*).

135. *labialis*, Kirb.—A single female taken on hawthorn blossoms near Ipswich in 1893.

136. *minutula*, Kirb. (2nd brood).—Barham (*Kirby*); not rare, Clopton and Grundisburgh.

parvula, Kirb. (1st brood).—Barham (*Kirby*); common in the spring on dandelions, &c.

137. *nana*, Kirb.—Twice taken at Barham (*Kirby*). Not uncommon.

138. *proxima*, Kirb.—Barham; rare (*Kirby*); one female on Umbelliferæ at Great Blakenham, June 10th, 1897 [E. M. M., Dec., 1897].

139. *dorsata*, Kirb.—Very frequently in flowers at Barham (*Kirby*); rare; one female at Baylham, by the Gipping, July 24th, 1897.

140. *afzeliella*, Kirb.—Barham (*Kirby*); rare; not seen in the Ipswich district since 1893.

var. *fuscata*, Kirb.—Barhamiæ, Maio medio 1800 in floribus lecta (*Kirby*).

var. *convexiuscula*, Kirb.—Barham (*Kirby*).

141. *wilkella*. Kirb.—Barham (*Kirby*); not rare; beaten from bushes; Foxhall, Bentley Woods, &c.

142. *similis*, Sm.—Bentley Woods; females beaten rarely from *Populus alba* in 1897.

Dasypoda, Latr.

143. *hirtipes*.—Barham (*Kirby*).

CILISSA, Leach.

144. *hæmorrhoidalis*, Fab.—Barhamiæ in floribus Campanulæ rotundicolæ et Trachelii (*Kirby*).

145. *leporina*, Panz.—Uncommon on the banks of the Orwell and in Bentley Woods. I should suspect this to be the species to which Kirby refers, if the synonymy were less lucid.

PANURGUS, Panz.

146. *calcaratus*, Scop.—One taken on Martlesham Heath (*Kirby*).

147. *ursinus*, Gmel.—In Suffolciâ a nobis semel lecta, Septembre ineunti 1797, in ericeto dicto Martlesham Heath (*Kirby*).

NOMADA, Fab.

148. *fuscata*, Panz.—Barham; rare 1799, (*Kirby*).

149. *solidaginis*, Panz.—Barham and Martlesham Heath in ragwort flowers (*Kirby*); Bentley Woods, Foxhall, and Bixley, common.

150. *succincta*, Panz.—In flowers of *Ribes grossularia*, Barham (*Kirby*); not common; Bentley Woods, &c.

151. *lineola*, Panz.—"Barhamiæ, in floribus Geranii reflexi, in Salicis capreæ amentis" (*Kirby*).

152. *alternata*, Kirb.—In flowers of *Ranunculus bulbosus* and *Ribes grossularia* at Barham (*Kirby*); somewhat common.

153. *jacobææ*, Panz.—Taken in flowers of *Senecio jacobæa* at Barham, September, 1799 (*Kirby*); very rare; Bramford Marshes, on ragwort, on Aug. 7th, 1897.

154. *lathburiana*, Kirb.—Near Woodbridge (*Kirby*).

155. *guttulata*, Schk.—The second British specimen, found sitting on a composite flower at Bentley Woods, May 17th, 1897. [E. M. M., December, 1897].

156. *ruficornis*, Linn.—Barham (*Kirby*); Common.

157. *ochrostoma*, Kirb.—Taken very rarely in 1894 near Ipswich.

158. *fabriciana*, Linn.—Very rare at Barham (*Kirby*).

159. *flavoguttata*, Kirb.—Very rare at Barham (*Kirby*).

160. *furva*, Panz.—Very rare at Barham (*Kirby*).

EPEOLUS, Latr.

161. *productus*, Thoms.—Common at Foxhall, Bentley Woods, and Bramford, upon ragwort, and at burrows of *Colletes daviesana*, upon which it is parasitic. This is probably Kirby's *Apis variegata*, which he took at Barham in August, 1797 and 1798.

162. *rufipes*, Thoms.—Rare; occurred with the above at Foxhall in 1895 and 1897.

MELECTA, Latr.

163. *armata*, Panz.—Barham (*Kirby*); not very common; Ipswich, and boring into the clay banks of the Orwell.

CŒLIOXYS, Latr.

164. *quadridentata*, Linn.—Ipswich; common (*Rothney*).

165. *elongata*, Lep.—Barham (*Kirby*); rare; Foxhall in August, 1897.

MEGACHILE, Latr.

166. *maritima*, Kirb. — "In maritimis, prope Landguard Fort in Suffolciâ semel lecta" (*Kirby*), and I have since taken it commonly on the same spot.

167. *willughbiella*, Kirb.—Barham (*Kirby*); one at a post in Bentley Woods, in which was a colony of *Odynerus sinuatus*.

168. *ligniseca*, Kirb.—Barham (*Kirby*).

169. *centuncularis*, Linn.—Barham (*Kirby*); by no means common; Ipswich, &c.

170. *argentata*, Fab.—Common with *M. maritima* on the sandhills at Felixstowe.

Anthidium, Fab.

171. *manicatum*, Linn.—Not common; Great Blakenham, &c.

Stelis, Panz.

172. *aterrima*, Panz.—Barhamiæ, tempore autumnali, bis capta (*Kirby*).

173. *phæoptera*, Kirb.—Barhamiæ Augusto exeunto 1799 lecta (*Kirby*).

Chelostoma, Latr.

174. *florisomne*, Linn.—Rarely in flowers at Barham (*Kirby*).

175. *campanularum*, Kirb.—Barham, frequently in flowers of *Campanula* (*Kirby*).

Osmia, Panz.

176. *rufa*, Linn.—Blakenham Magna and Barham (*Kirby*); uncommon; Wherstead, in a pine railing, and Little Blakenham.

177. *xanthomelana*, Kirb.—Henley, near Ipswich, and once, July, 1798. at Somersham (*Kirby*).

178. *cærulescens*, Linn.—Barham (*Kirby*); very uncommon; singly at Belstead and Little Blakenham.

179. *fulviventris*, Panz.—Rarely at Barham, on thistles, in the autumn (*Kirby*).

180. *aurulenta*, Panz.—Henley (*Kirby*). [This is synonymous with the female of his *Apis tunensis;* the male = *O. xanthomelana*, Kirb.]

181. *leucomelana*, Kirb.—Coddenhamiæ, prope Needham Market in Suffolciâ in floribus Leontodontis, semel lecta (*Kirby*).

182. *spinulosa*, Kirb.—Rare at Witnesham and Little Blakenham (*Kirby*).

183. *bicolor*, Schk.—One taken at Barham, and twice at Great Blakenham (*Kirby*).

Ceratina, Latr.

184. *cyanea*, Fab.—Once taken in Barham, in the flowers of *Senecio jacobæa*, in the autumn of 1799 (*Kirby*).

Eucera, Scop.

185. *longicornis*, Linn.—Barham (*Kirby*); not uncommon in the Bentley district.

Anthophora, Latr.

186. *retusa*, Linn.—Exceedingly rare; the only Suffolk specimen is a female I took at Ipswich in 1893.

187. *pilipes*, Fab.—Barham (*Kirby*); common on flowers.

188. *furcata*, Panz.—Occurs sparingly in the Bentley Woods.

Saropoda, Latr.

190. *bimaculata*, Panz.—"Circa aggerem apricum prope Woodbridge volitantem feminam bis cepi" (*Kirby*).

Psithyrus, Lep.

191. *rupestris*, Fab.—Barham (*Kirby*); common on ragwort.

192. *vestalis*, Fourc.—Barham (*Kirby*); not uncommon.

193. *barbutellus*, Kirb.—The males frequent in thistles at Barham (*Kirby*).

194. *campestris*, Panz.—Barham (*Kirby*); probably common, though I have never taken it.

Bombus, Latr.
195. *venustus*, Sm.—Very common.
196. *agrorum*, Schmied.—Barham (*Kirby*); very common.
197. *latreillellus*, Kirb.—Barham, on thistles (*Kirby*); Foxhall.
198. *hortorum*, Linn.—Barham (*Kirby*); somewhat common.
var. *harrisellus*, Kirb.—Barham (*Kirby*).
199. *schrimshiranus*, Kirb.—Rare in flowers at Barham (*Kirby*).
200. *pratorum*, Linn.—Barham (*Kirby*); very common. Kirby named a variety of this insect *burrellana*, "in honorem Rev. D. Burrell, insectorum Collectoris assidui." Probably this was the Rev. J. Burrell, F.L.S., who first took *Pogonus burrellii*, Curt. (now *luridipennis*, Germ.) in Britain in 1806.
201. *sylvarum*, Linn.—Barham (*Kirby*); somewhat common.
202. *derhamellus*, Kirb.—Barham; rare (*Kirby*).
203. *soroensis*, Fab.—Once taken at Witnesham (*Kirby*); Ipswich (*Rothney*).
204. *lapidarius*, Linn.—Barham (*Kirby*); common.
205. *terrestris*, Linn.—Barham (*Kirby*); common.
var. *lucorum*, Sm.—Barham (*Kirby*); Bentley Woods.
Apis, Linn.
206. *mellifica*, Linn.—Common, but, as Mr. Saunders says, rarely, if ever, found wild.

Note.—I have heard from my friend Mr. Ernest E. Austen that Mr. A. Piffard collected some good things in this order at Felixstowe during August, 1896, but I had no time, before sending in these notes, either to write to Mr. Piffard or examine the specimens taken.

CODE OF LAWS OF THE ENTOMOLOGICAL CLUB.

At the Meeting of the Entomological Club, held at the Holborn Restaurant, on Tuesday, January 18th, 1898, the following new Code of Rules was proposed by Mr. S. Stevens (the senior Member of the Club), and seconded by Dr. P. B. Mason, Mr. G. H. Verrall being in the chair; the other Members present being Messrs. G. T. Porritt, T. W. Hall, and R. South.

PREAMBLE.

Whereas an Entomological Club established in London in the year 1826 for the purpose of social meetings at the residences of its members for the communication of facts, the comparison of notes, the naming of specimens, and mutual improvement in the science of Entomology has existed and met from time to time; and whereas the Code of Laws adopted in 1836 has continued with very slight alterations until the present time; and whereas that Code of Laws has become antiquated: It is Resolved and Agreed, that all former Rules and Regulations shall cease and determine, and the following be adopted as the Laws of the Club.

CODE OF LAWS.

I.—That this Club be entitled the Entomological Club.

II.—That the Club consist of eight Members.

III.—That the Club may elect an unlimited number of *Honorary Corresponding Members*.

IV.—That any vacancy occurring in the Club be filled up by election from the Honorary Corresponding Members.

V.—That a Candidate for Membership be proposed and seconded at an ordinary Meeting of the Club, and be balloted for at the next Meeting. A single negative to exclude.

VI.—That the Honorary Corresponding Members have an equal right with the Members to attend the ordinary Meetings of the Club; and to introduce Visitors, either personally or by letter, according to the Regulations provided from time to time, to inspect the Collection.

VII.—That no subscription or pecuniary consideration whatever be an essential qualification to Membership in this Club, but that all voluntary contributions from Members, Honorary Members, or others, be received and applied to the purposes of the Club.

VIII.—That a Secretary and Curator be appointed to hold office until resignation, disqualification, or notice of removal from office by resolution carried at some ordinary Meeting of the Club.

IX.—That each Member of the Club shall, if possible, hold a Meeting of the Members each year and be chairman thereof. Two to form a quorum.

X.—That the property of the Club be vested in two Trustees elected annually, and that none of it be alienated unless a majority (consisting of not less than four) of the Members are in favour of the same.

XI.—That no Member shall possess any right or property in the Club disposable either during life or by testament.

XII.—No alteration in these Laws shall be made unless at least four Members (being a majority of those present) vote in its favour; due notice of the proposed alteration having been given at least ten days before the Meeting.

XIII.—That every present and future Member of the Club shall be bound to abide by these Laws, unless altered as provided by Law XII.

NOTES AND OBSERVATIONS.

The Rhopalocera of Birmingham and District. — The following is a list of the Diurni occurring within a radius of twelve miles of the city of Birmingham. I published a list of the Sphingidæ of the same district (Entom. xxx. 239). Nearer the city insects were much more abundant than at present, but the rapid strides of the builder have unfortunately proved effectual in the destruction of many species; however, beyond his reach insects abound in the "Warwickshire lanes," which happily still retain their natural aspect and beauty. The district under consideration comprises no extensive heaths or woodlands, and the country bears a very uniform appearance, together with but little variation of the soil, and consequently the number of species to be met with is not large. The following is a complete list, as far as I have been able to ascertain, chiefly by means of my own observations. It includes thirty-six species :—

Pieris brassicæ. By no means plentiful some years, and very intermittent in its appearances. I do not ever remember seeing it really common in the suburbs of Birmingham.—*P. rapæ.* Very common.—*P. napi.* Also common, but the first brood is often considerably rarer than the second.

Leucophasia sinapis. This insect is unfortunately approaching extinction in the midlands; there is but one locality in the district for it, and it is scarce there.

Euchloë cardamines. Plentifully distributed in the lanes; females are often unusually large.

Gonepteryx rhamni. This insect is fairly common in many localities, but I very seldom meet with it around here (Moseley). The buckthorn is by no means a common and generally distributed plant in this part.

Colias edusa. A scarce visitor; one or two examples have been noted at various periods in Sutton Park, and lately one has been captured near Knowle.

Satyrus egeria. Not common, and is rather local, and seems to be getting scarcer.—*S. megæra.* Fairly abundant.

Epinephele ianira. Common throughout the district.—*E. tithonus.* Common in some localities, such as Sutton Park, but does not seem to be very evenly distributed.—*E. hyperanthus.* Thinly dispersed in most parts.

Cœnonympha pamphilus. Common; is especially abundant in Sutton Park, where it varies to a very considerable degree. The ocelli are often very well developed on the upper side of the primaries; on the secondaries, underneath, they are conspicuously absent occasionally, at other times so well developed as to form an almost unbroken band.

Vanessa urticæ. Very common.—*V. atalanta.* Abundant everywhere; in 1895, with the exception of *Pieris rapæ*, it was the commonest butterfly of the year.—*V. io.* Fairly plentiful, but irregular in its appearances. The last three years I have hardly seen a dozen examples.—*V. polychloros.* Used to be by no means uncommon, but is now comparatively seldom seen.—*V. antiopa.* Sir Francis Scott records a couple at Great Barr in the 'Entomologist' (1880). Single examples have been seen at Moseley and in Sutton Park, but several years ago.—*V. cardui.* Not often visits. Observed a worn example last year; was probably a far-travelled individual.

Argynnis paphia. Local; Sutton Park, where it is often rather abundant.—*A. adippe.* Sutton Park; scarce.—*A. euphrosyne.* Lanes, &c., around Knowle, Flockley Heath, Coleshill, also Sutton Park; but not very common.—*A. selene.* Occurs in the above localities, but is more restricted to a few favoured haunts.

Melitæa artemis. Rare and local; near Umberslade (Worcester).

Thecla rubi. Plentiful in Sutton Park, especially at the flowers of holly, which grows in greater abundance there than at any other place that I am aware of in the county.—*T. quercus.* Chiefly at Sutton.

Lycæna argiolus. Generally distributed in the holly-bounded lanes around Hall Green and Yardley Wood; plentiful near Coleshill; in Sutton Park during some years it absolutely swarms. Have never seen the second brood here.—*L. ægon.* Heaths in Sutton Park, also near Coleshill; but is often scarce.—*L. acis.* Occurred around Shirley many years ago, but picture dealers and others have long banished the species.—*L. icarus.* Common everywhere in the rural district.

Polyommatus phlæas. In abundance; "bleached" examples are frequent in Sutton Park, chiefly females. The males often have the coppery colour much intensified, and the black edging of the wings considerably widened.

Syrichthus malvæ. Plentiful.

Thanaos tages. Local; railway embankment, Sutton Park, and elsewhere.

Hesperia linea. Common.

H. sylvanus. The commonest "skipper."—Augustus D. Imms; "Linthurst," Oxford Road, Moseley, near Birmingham.

Epione parallelaria, Schiff. (=E. vespertaria, St.) in Scotland and the North of England.—With reference to the notes on the capture of this moth in Scotland, which have appeared in the last two numbers of the 'Entomologist,' it may not be without interest to record that I have a specimen—a rather worn female—which I took at Newham Bog, in North Northumberland, on Aug. 20th, 1890. This is the only instance in which I have met with this insect in this district, but, as I have elsewhere pointed out ('History of Berwickshire Naturalists' Club,' vol. xv. p. 299), there is a record for Learmouth Bog so long ago as July 30th, 1863. Learmouth is not more than a mile, as the crow flies, from the Scottish border, and about eighteen miles from Newham. I have not seen the Ent. Mo. Mag. containing the Hawick records, but further particulars of the captures would, I am sure, be of interest to North Country entomologists.—George Bolam; Berwick-on-Tweed, Jan. 10th.

Heliothis armigera in South Devon.—I have read with much interest your paper on *H. armigera.* I think there can be no doubt that this insect is truly indigenous in S. Devon. It was taken regularly for years, between 1860 and 1870, at Torquay, by Mr. Terry, a famous local entomologist, at ivy bloom; and in October, 1869, I saw a specimen that had been taken on the previous night at arbutus flowers, by another entomologist, who told me that he took one or two every year. This, of course, was before tomatoes were imported in any very large quantity, and I do not think that imported tomatoes were much sent into S. Devon at that time. Last August, about the 15th, the Rev. Dobrée Fox and myself took one specimen at sugar in S. Devon, which fell to his share, and which is now in his cabinet. It was taken close to a barley field, in which was an undergrowth of clover. I think that following the reaping machine in similar fields might lead to the capture of more specimens, but fine weather would be necessary, and that we did not often get.—F. C. Woodforde; Market Drayton, Salop, Jan. 2nd, 1898.

Heliothis armigera.—With reference to your note on *H. armigera*, it might be interesting to you to know that I obtained from a fruiterer's shop in Poole a larva, which had been received in a consignment of tomatoes from Portugal (what part I do not know), which answered fairly well to the description of the larva of *H. armigera*, and emerged on Oct. 1st, 1897, as an imago of that species, though so much crippled on one side as to be useless as a specimen.—W. Parkinson Curtis; Aysgarth, Longfleet, Poole, Jan. 9th, 1898.

I was very interested in your remarks on this species, *ante*, p. 17. I may add that I get larvæ yearly from imported tomatoes. Last season they were all from Canary Island fruit, and I only reared two moths.—J. Arkle.

Preoccupied Names.—It may be well to call attention to the following names, lately proposed for insects, which are preoccupied. It may be left to their authors to find substitutes:—

Astatus, Péringuey, Tr. S. African Soc. viii. 237. This name properly belongs to a well-known genus of Fossorial Hymenoptera.

Harpalus fallax, Péringuey, *t. c.* 444. Not *H. fallax*, Leconte.

Dejeania, Oberthür, Etudes Ent. xx. p. 40. This name properly belongs to a genus of large Tachinid flies.

Paryphanta, Karsch, Ent. Nachr. xxii. 267. The name rightly belongs to a genus of Mollusca.

Andrena sodalis, Cameron, Mem. Manchester Soc. xli. No. 4, p. 121. Not *A. sodalis*, Smith, a Mexican species.

Halictus picipes, Cameron, *t. c.* p. 101. Not *H. picipes*, F. Morawitz.

Halictus amœnus, Bingham, P. Z. S. 1896, p. 451. Not *H. amœnus*, Spinola.—T. D. A. Cockerell; Mesilla Park, New Mexico, U.S.A., Dec. 19th, 1897.

Prodenia littoralis in England.—On Nov. 26th last I received from Mr. C. Bartlett, of Bristol, a moth which he had bred on Aug. 3rd. I had no difficulty in identifying the insect as *Prodenia littoralis*, and advised him to that effect, at the same time asking for further information. Unfortunately Mr. Bartlett does not appear to be able to fix the exact locality where he obtained the larva, but thinks that he found it on dock at Brockley. In 1890 Mr. Boden bred an example of this species from a larva found feeding on an imported tomato, and it occurs to me that probably the larva which produced the imago now referred to may have come into this country among tomatoes or other imported produce. According to Hampson (Fauna, Brit. Ind. Moths, ii. p. 246) *P. littoralis* occurs in the Mediterranean subregion and throughout the tropical and subtropical zones of the Old World. Kirby ('European Butterflies and Moths,' p. 237) states that the imago is found in March and April, and the larva from November to February feeding on low plants. The species was described by Boisduval in 1834 as *Hadena littoralis* (Faun. Ent. Madag. Lép. p. 91, pl. xiii. fig. 8), and it has been redescribed twice by Guenée, and under three different names by Walker; *Neuria retina*, Freyer, is also a synonym.—Richard South.

CAPTURES AND FIELD REPORTS.

Notes on Suffolk Lepidoptera in 1897.—The year 1897 can hardly be regarded as a record one from an entomological point of view. Lepidoptera were decidedly scarce in and around Ipswich; hence but few pages were utilised in the diary from which the present notes are extracted. The following note may be quoted as a general remark on the earlier months of the year:—"Moths decidedly scarce; weather cold and unsettled, with a continuance of winds right up to June, consistent with generally accepted theory that if the sun crosses the line on March 21st in bad weather, the same will continue till the longest day. In May, generally the best month for collecting, had quite an empty diary. Micros conspicuous by their absence." *Hybernia rupicapraria* and *Anisopteryx æscularia* ought to be excepted from the foregoing remarks. The former was very common at light in February from the 5th. In the concluding summer and autumn months gloriously fine, dry weather was experienced, the driest in fact since a quarter of a century back, but the scarcity of moths was truly remarkable.

Nothing of exceptional interest was taken amongst the Macros except specimens of *Acidalia trigeminata*, *Lobophora sexalisata*, and *Hecatera serena*, on tree-trunks; and *Chærocampa elpenor*, on the wing at dusk. Visiting Bentley Wood towards the end of May, solitary specimens of *Nemeobius lucina*, *Gonepteryx rhamni*, and *Thanaos tages* were netted. The latter, like *Vanessa io* and *V. urticæ*, were very dilapidated. *Anthocaris cardamines* and *Lycæna argiolus* were common, the latter on holly blossom. *Argynnis euphrosyne* abounded, in lovely condition, and several *Pieris brassicæ*, which were rare in 1896, were noticed on the wing.

Amongst the list of the Micros are several which have only been recorded once before in the county. The following were taken in June:—*Elachista rufocinerea*, *E. cygnipennella* (common), *Xanthosetia hamana* (at Offton), *Argyresthia retinella* (on palings in Belstead), *A. nitidella* (common), *Antithesia pruniana* (less common than usual), *Spilonota roborana*, and *S. rosæcolana*, *Conchylis straminea*, *Tortrix viridana*, *Sericoris lacuana*, *Gelechia terrella* (flying commonly amongst buttercups at Bentley), *Eudorea pyralella*, *E. ambigualis*, and *E. mercurella*, *Gelechia proximella* (common on oak-trunks), *Roxana arcuella*, *Cræsia bergmanniana*, &c. The July captures include *Tinea biselliella* (in swarms in my house), *T. ferruginella*, *Gelechia affinis*, *Spilonota ocellana*, *S. sufficiana* (*trimaculana*), *Œcophora pseudo-spretella*, and *Œ. fuscescens*, *Eudorea cembræ*, *Phibalocera quercana*, *Phoxopteryx uncana* (in cop. on honeysuckle). The following were detected under wall ledges:—*Gelechia fugitivella*, *Œcophora lambdella* (two fine specimens of this species—rare in Suffolk), *Pædisca bilunana*, *Hyponomeuta padellus*, *Bupalis argyrestella*, *Batodes angustiorana*. The records of the Suffolk list were augmented on Aug. 7th by two species, one (*Dasycera oliverella*) taken at Stratford St. Mary, and the other (*Peronea comparana*) at Nayland. Both places are distantly situated from Ipswich. At the former town I boxed *Harpipteryx xylostella*, *Gelechia maculea* (several seen on birch-trunks), *Bactra lanceolana*, *Ebulea crocealis*, and *Dicrorampha politana*. During the same month I discovered that the stone parapets of railway bridges were very productive of insects just before sundown. By this means I added *Œcophora tinctella* (Ipswich), *Tinea cloacella*, *Glyphipteryx syringella*, *Lithocolletis corylifoliella*, *L. sylvella*, *Lyonetia clerckella*, and other more common species. The records for the year were concluded in September by the capture of *Depressaria subpropinquella* and *Argyresthia brockella.*—Claude A. Pyett; Ipswich, December, 1897.

Agrotis obscura and Acronycta strigosa in Gloucestershire.—One specimen of each of the above was taken by me at sugar last June. I believe the latter has not been previously reported from this part of Gloucestershire. *C. octogesima,* one at light and at sugar, and *A. cinerea,* eight at light, were also taken.—J. D. Birchall; Bowden Hall, near Gloucester, Jan. 6th, 1898.

Early Appearance of Phigalia pedaria (pilosaria).—I took a fine male *P. pedaria* off a gas lamp outside Chester on Dec. 18th. The earliest appearance of the moth I can find is Nov. 27th, 1881 (Entom. xx. 110).—J. Arkle; Chester.

SOCIETIES.

Entomological Society of London.—*Annual Meeting, January 19th,* 1898.—Mr. Roland Trimen, F.R.S., F.L.S., President, in the chair. The balance-sheet for the past year, showing a balance in favour of the Society, and an improvement in the financial position, was read by Mr. A. H. Jones, one of the Auditors. The Secretary then read the Report of the Council, from which it was seen that during 1897 the Society had lost 7 Fellows by death and 5 by resignation, and had elected 24, the total number now upon the list being 398. The Transactions for the Year contained 19 memoirs, illustrated by 11 plates, and extending to 434 pages. As a mark of respect to the late Mr. J. W. Dunning, the Council had decided to present his portrait as a frontispiece to the volume of Transactions for 1897. It was announced that the following Fellows had been elected as Officers and Council for 1898:—President, Mr. R. Trimen, F.R.S.; Treasurer, Mr. R. McLachlan, F.R.S.; Secretaries, Mr. W. F. H. Blandford and Mr. Frederic Merrifield; Librarian, Mr. G. C. Champion; and as other Members of Council, Mr. W. Bateson, F.R.S., Dr. T. A. Chapman, Sir G. F. Hampson, Bart., Mr. M. Jacoby, Mr. A. H. Jones, Dr. P. B. Mason, Mr. O. Salvin, F.R.S., Mr. J. W. Tutt, Mr. G. H. Verrall, and Mr. C. O. Waterhouse. The President nominated as Vice-Presidents, Sir George Hampson, Mr. McLachlan, and Mr. Verrall, and his Address was then read on his behalf by the Secretary. After briefly reviewing the position of the Society, and referring to the losses of the past year through deaths within and without the Society, particularly those of Dr. Fritz Müller, Mr. J. W. Dunning, Captain E. Y. Watson, Dr. G. H. Horn, the Rev. A. Matthews, and Herr Rogenhofer, the President proceeded to review the subject of Mimicry. The historical development of the theory by the work of Bates, Wallace, and the President himself, together with the later amplifications of the Batesian theory by Müller, Meldola, Poulton, Haase, and Dixey, was traced. An account was next given of the forms of mimicry existing outside the Lepidoptera, and in the order itself a general summary was made of the relationships, as model or mimic, existing among Rhopalocera, Heterocera, and between these two suborders respectively, the group of phenomena exhibited by *Papilio merope, P.*

cenea, *P. meriones*, *P. antinorii*, and their allies being discussed in detail. He next dealt with the evidence on points such as the persecution by insectivorous foes, and with respect to attacks by birds, admitted the poverty of existing evidence, but concluded that this was largely due to the neglect of well-directed and sustained observation, and that what had been published went far in the direction of proving that birds must still be reckoned among the principal enemies of butterflies. He congratulated the Society on the fact that the chief part in investigating and generalizing on this subject had been borne by its Fellows, and concluded with an earnest appeal for the establishment of biological stations, similar to marine stations, for the study of the terrestrial fauna of the tropics under favourable conditions. On the motion of Lord Walsingham, seconded by Mr. F. D. Godman, a vote of thanks to the President, for his able summary of the subject and his services during the year, was carried by acclamation; and the proceedings terminated with a vote of thanks to the other officers, moved by Professor Poulton, seconded by Col. Yerbury, and acknowledged by Mr. McLachlan and Mr. Blandford.—W. F. H. Blandford, *Hon. Sec.*

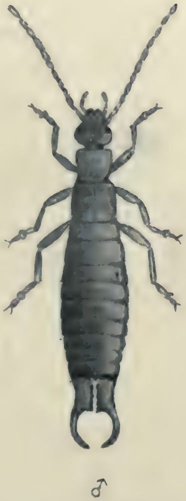
RECENT LITERATURE.

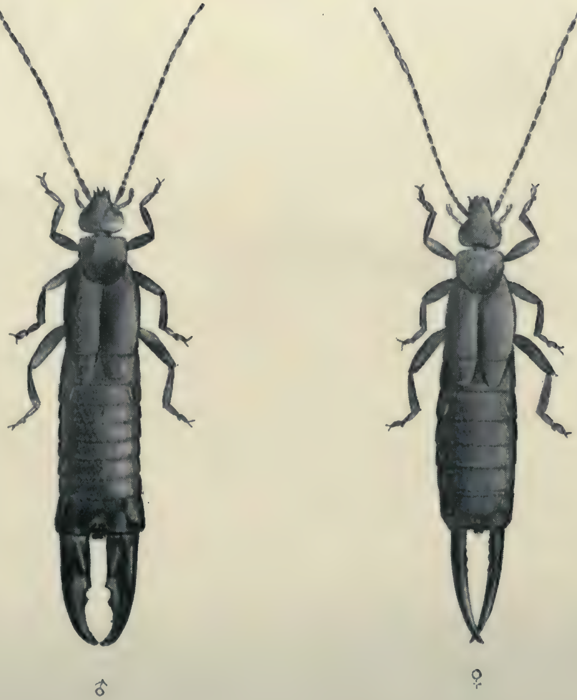
Proceedimgs of the South London Entomological and Natural History Society. Part I., pp. 68. Published at the Society's Rooms, Hibernia Chambers, S.E. 1897.

In order to ensure earlier publication of papers read at the meetings, the 'Proceedings' of this Society are now issued in two parts. The instalment before us comprises nine papers, all of which, with the exception of two on Crustacea by Mr. Step, treat of Lepidoptera, and of these the most important are—"Some Considerations of Natural Genera, and Incidental References to the Nature of Species," by Mr. J. W. Tutt; and "The British Day Butterflies, and the Changes in the Wings of Butterflies," by Prof. A. Radcliffe Grote. All students of systematic entomological work should make a point of reading both these papers, as they deal with some very interesting matters connected with a proper understanding of the subject, and a due appreciation of the value attaching to structural characters in the formation of genera and the higher divisions.

Phylogeny no doubt is the basis upon which classification should be founded; but from the arguments brought forward in the two papers referred to above, it would appear that those who are engaged in this branch of the science are not altogether in accord. It seems that not only the structural details of the perfect insect, but those also of the earlier stages of species, will have to be further enquired into and studied before a system with any claims to stability is likely to be established.

For all practical purposes the arrangement of British butterflies now in vogue is not inadequate, and will probably continue in use for many years to come. The present sequence of species, genera, and families is perhaps hardly less natural than the order in which they are placed in the newer arrangements.





W. J. Lucas del.

Fig. 1.—*Forficula lesnei*, male (× 3).

Figs. 2 & 3.—*Chelisoches morio*, male and female (× 3).

THE ENTOMOLOGIST

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INTERESTING EARWIGS.

By W. J. Lucas, B.A.

(Plate I.)

Forficula lesnei, Finot.

Last year Mr. Burr announced that an earwig he had taken on the Warren at Folkestone in September, 1896, and recorded as *Forficula pubescens*, was not that species. For, after examining a figure of it, M. de Bormans had suggested that it should rather be referred to *F. lesnei* of Finot. A further examination of the insect by Mr. Burr and a comparison of it with Finot's figures and description left no doubt that the Folkestone insect was a true *F. lesnei*. A specimen has since been taken at Wallingford in Berkshire; while there is a very old specimen, labelled "Kingstone," in the Hope Collection in Oxford. Lately Mr. W. West gave me a specimen, making the fourth to be recorded, which he took in October last while sweeping on the chalk near Reigate in Surrey, at a spot where *Ononis* was growing profusely. This insect, a male, in good condition, is here figured three times natural size (Plate I. fig. 1).

F. lesnei has been taken amongst rough grass in September in various places in the north-west of France, while *F. pubescens* is essentially a south European insect; consequently it is possible that the specimens of the latter recorded as taken in the Scilly Isles, and at Charmouth, Weymouth, Bonchurch, and Glanvilles Wootton by Messrs. J. C. and C. W. Dale, and at Salisbury by Curtis, may turn out to be *F. lesnei* also, though, of course, both insects may be present in the South of England. This earwig is no doubt native, and is perhaps not so rare as the small number of recorded captures would make it appear; for it must be remembered that it cannot fly, and therefore to continue the species the male must find the female by help of its legs alone—a state of things which hardly points to the insect being extremely rare. Consequently coleopterists, and others who use a sweeping-net, would do well to examine more closely any earwigs that may be captured.

F. lesnei sufficiently resembles *F. auricularia* to shew it to be a *Forficula*, while the pale colour, absence of wings, and shape of forceps would readily distinguish it from the common species. Four other wingless earwigs have been recorded for Britain, but of these two—*Anisolabis maritima* and *A. annulipes*—have not even wing-cases, while the other two—*Apterygida albipennis* and *A. arachidis*—are much smaller insects. Moreover, not one of the four, possibly excepting *albipennis*, is, I think, likely to be found in a wild state in this country. The male *F. lesnei* differs from *F. pubescens* in the shape of the forceps. In the former the free, curved, forked parts are equal in length to the flattened contiguous parts; while in the latter species the curved parts are much less than half the total length of the forceps. In *F. lesnei*, also, the curved ends of the forceps do not nearly meet, as they do in *F. pubescens*.

Chelisoches morio, Fabr.

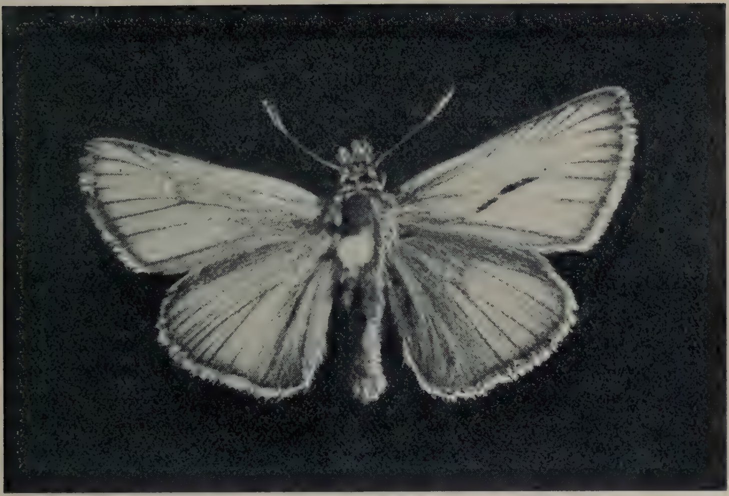
Chelisoches morio is a casual visitor in this country, and cannot with any justice be called a British insect. The two specimens figured, three times natural size (Plate I. figs. 2 and 3), were taken in Kew Gardens, whither they came in sugar-cane from Mauritius in August, 1894. Being somewhat cosmopolitan, however, the species may perhaps be met with here again. It is widely distributed in the islands of the Pacific and Indian Oceans, and some of the neighbouring countries.

C. morio is a large, bulky, shining-black earwig, with fully developed wing-cases and wings. The antennæ are of about seventeen joints, and black in colour, except two joints near the tip. The legs are black, with the exception of the tarsi, which are pale yellowish brown, and of which the second joint is extended as a lobe below the third. The male forceps are stout, especially at the base; those of the female are long and pointed.

February 16th, 1898.

ON A GYNANDROMORPHOUS SPECIMEN OF *ADOPÆA THAUMAS*, Hufn.

By James Edwards, F.E.S.



Adopæa thaumas, Hufn., ☿ (× 2·64).

By the kindness of my friend Mr. H. J. Thouless I have been able to photograph, and through the courtesy of the Editor to publish, the accompanying figure of a gynandromorphous specimen of *Adopæa thaumas*, Hufn. It was captured by Mr. Thouless at Drayton, Norfolk, on August 3rd, 1896.

The genitalia are male, and of the full size; the only abnormal features (so far as can be ascertained without dissection) being much flattening and distortion of the apical lobe of the tegumen, and the presence on the left side of a large supplementary chitinous lobe which appears to spring from nearly the same point as the clasp.

Gynandromorphism amongst the Hesperiidæ appears to be rare; I have not met with any recorded instances. nor have I observed any amongst the large number of Hesperiidæ which I have had occasion to examine during the last few years. My acquaintance with the literature of the subject is, however, much less than I could wish.

That the absence of the sex-mark on the left fore wing of the specimen figured is not merely fortuitous may, I think, be safely conceded when the abnormality in the genitalia is taken into consideration. In this connection it may be well to note that

Mr. Leech (Butt. China, &c., p. 592, pl. xl., figs. 1 and 4, male; 2, female) has described and figured an *Adopæa* from Chang-Yang, Central China, not having a sex-mark on the fore wing of the male, as a variety (*astigmata*, Leech) of *A. leonina*, Butler; but the better opinion would seem to be that originally entertained by Mr. Leech, namely, that *astigmata*, Leech, is a distinct species; since there appears to be no other recorded instance in the Hesperiidæ in which the alar sex-mark of the male is sometimes present and sometimes absent in the same species, and it appears that the sex-mark was wanting in all the males of the form under consideration received from that locality. The fact that the male genitalia in *astigmata*, Leech, are identical in shape and structure with those of *A. leonina*, Butler, merely proves that these organs are of the form common to *A. sylvatica*, Bremer; *A. tenebrosa*, Leech, and *A. leonina*, Butler.

Colesborne, Cheltenham.

DESCRIPTIONS OF SOME NEW SPECIES OF *DORYPHORA*.

By Martin Jacoby, F.E.S.

Doryphora venezuelensis, n. sp.

Ovate, very convex, dark fulvous; head and thorax nearly impunctate; elytra very finely punctate-striate, flavous, the sutural and lateral margins, a deeply dentate transverse band at the base, another below the middle, and a triangular spot near the apex, piceous. Length, 10 mill.

Head impunctate and without any impressions, fulvous; antennæ fuscous, the lower six joints fulvous, terminal joints widened, but longer than broad; thorax three times broader than long, the sides strongly rounded in front, rather constricted near the base, the anterior angles not produced into a tooth, the surface impunctate with the exception of a few strong punctures at the sides; a single deeper puncture is also placed at some distance each side of the lateral margin; the elytra are very finely punctured in irregular rows, distantly placed, the darker markings are of a piceous colour, with a distinct metallic-green gloss, and consist of a transverse band below the base, which includes a flavous spot near the scutellum, having its lower edge deeply irregularly dentate, a narrower band below the middle in shape of four elongate connected spots, a triangular spot near the apex; the suture and the lateral margins are of the same colour, the under side and legs dark fulvous, the mesosternal process short, stout, and straight.

Hab. Venezuela.

This *Doryphora*, of which a single specimen is contained in my collection, is evidently allied to *D. landolti*, Steinh. (Mittheil. Ent. Ver. München, 1877), but the author described the thorax as having a tooth or point at the anterior angles, which is not the case here; the elytra in *D. landolti* are also described as geminate and punctate-striate, and their design is different. *D. balyi*, Stål, is another closely allied species, but has a mucronate and punctured thorax, and the elytra are given with flavous margins and bands.

Doryphora scripta, n. sp.

Flavous; head and thorax closely punctured, stained with obscure piceous spots; elytra distinctly punctate-striate, the sutural and lateral margins, a large subtriangular elongate patch, and a triangular smaller spot near the apex dark fulvous. Length, 10 mill.

Of regular ovately rounded shape; the head closely and finely punctured, obscure fulvous, a narrow space surrounding the eyes paler; labrum broad, flavous, as well as the palpi; antennæ with the lower five joints flavous, the following two fuscous, the others wanting; thorax three times broader than long, the lateral margins slightly rounded and obliquely narrowed towards the apex, the anterior angles acute, but not mucronate, the surface rather crowded with differently-sized small punctures, those at the sides larger; the ground colour flavous, the disc stained with three very obscure piceous spots placed triangularly, the sides with a similar coloured oblique stripe, and another small spot above; scutellum flavous; elytra rather strongly punctate-striate, the punctures closely and not very regularly placed, the interstices finely aciculate here and there; the ground colour and the epipleuræ flavous, the disc with a longitudinal brown sutural stripe, which extends anteriorly as far as the third row of punctures, but posteriorly only to the second row; this stripe is joined at the apex to a similar but narrower band, which accompanies the lateral margins; a large brown subtriangular patch extends from the base to below the middle, and a smaller triangular spot occupies the posterior portion; the elytra may also be described as dark brown, interrupted by a subsutural and sublateral narrow flavous stripe, which is joined by another transverse curved narrow band below the middle dividing the two brown patches; under side and legs flavous, impunctate; mesosternal process stout and slightly curved.

Hab. ?.

Somewhat allied to *D. whitei*, Baly, but of different coloration and sculpturing. The single specimen in my collection was obtained by Mr. Whiteley, probably in Colombia.

Doryphora specularis, n. sp.

Pale fulvous or flavous; thorax finely rugose-punctate, with two small spots; elytra closely and strongly punctured, flavous, the lateral margins metallic-green, the suture anteriorly, including a small flavous spot and a broad discoidal longitudinal band pointed posteriorly, piceous. Length, 10 mm.

Of rather depressed, posteriorly deflexed shape; the head finely and rather closely punctured, flavous, the labrum testaceous; antennæ black, the basal two joints flavous below, terminal joints longer than broad; thorax rather more than twice as broad as long, the sides nearly straight, the anterior angles mucronate, the surface irregularly strongly rugose-punctate, the sides more strongly and confluently punctured, the middle sometimes with a raised line, each side of which a small spot (sometimes absent) is placed; scutellum triangular, flavous; elytra strongly deflexed at the posterior half, strongly, irregularly, and closely punctured at the sides, the punctures arranged in rows near the suture; the lateral margins narrowly metallic-green, this colour preceded by a narrow flavous stripe; a similar stripe accompanies the suture at the posterior two-thirds of its length, and joins the lateral one at its apex, and a small flavous spot is placed at the base each side of the scutellum; the rest of the surface is piceous, with a slight metallic gloss; the epipleuræ, the under side, and legs are flavous and impunctate; the mesosternal process is slightly curved.

Hab. ?.

Of this species I possess two specimens, unfortunately without locality. In the system of coloration they agree somewhat with *D. columbina*, Stål, but the sculpturing of the thorax and other details are quite different. In one of the specimens the small flavous basal spot is almost connected with the sutural stripe; in the other it is well separated by the darker portion of the elytra.

Doryphora castanea, n. sp.

Below black, above fulvous; thorax finely and not closely punctured; elytra as finely punctured, the punctures irregularly arranged, with finely aciculate interstices. Length, 14 mill.

Head somewhat closely punctured, the clypeus separated from the face by a semicircular groove, closely punctured, apex of the mandibles and the palpi black; antennæ not extending much beyond the base of the elytra, black, the lower three joints fulvous below, terminal joints dilated, slightly longer than broad; thorax three times broader than long, the sides strongly rounded and widened at the middle, the anterior angles produced; the disc convex, much depressed laterally, finely and subremotely punctured; scutellum narrowly margined with piceous; elytra irregularly and finely punctured, the punctures here and there arranged in rows, the interstices finely aciculate; under side, with the exception of the flanks of the thorax, black, shining, sparingly punctured; legs rather slender; mesosternal process stout, short, and straight.

Hab. Ecuador, Rio Dogua.

Of this species I possess three specimens. The uniform fulvous colour of the upper side, in connection with the black antennæ, under side and legs, and the fine punctuation, will assist in the recognition of the insect.

Doryphora facialis, n. sp.

Piceous; the antennæ and legs fulvous; head and thorax greenish black, opaque, the margins fulvous; elytra finely geminate punctate-striate, flavous; the suture, a spot on the shoulder, a short transverse stripe at the base, a triangular spot at the suture below the scutellum, and a spot below the middle at the lateral margin, dark green. Length, 10–12 mill.

Head greenish black, opaque, very sparingly and finely punctured; antennæ short, fulvous, the terminal joints broadly flattened; thorax nearly three times broader than long, the sides straight at the base, rounded before the middle, the anterior angles broadly produced, the surface opaque, silky, greenish, the disc with a few fine punctures, the sides with some stronger ones; the anterior margin, the angles, and (sometimes) the sides more or less stained with fulvous; scutellum black, smooth; elytra with their greatest convexity near the base, finely punctured in irregular double rows, flavous, the shoulders and the lateral margins below the middle with a dark green spot, a narrow short transverse stripe directly below the base, a triangular sutural spot below the scutellum, and the suture narrowly dark green; the shoulder spot extends also to the elytral epipleuræ, which are flavous at their other portion, except at their inner margin; the under side piceous, strongly punctured; legs fulvous; the mesosternal process short, flat, and straight.

Hab. Brazils ?.

Of this species, which would perhaps best be placed near *D. axillaris*, Germ., two specimens are before me; one in the collection of the Oxford Museum, the other in that of my own. They were probably obtained in some parts of the Brazils. I know of no other species with which it could be confounded, but the system of coloration and general size and shape of the insect greatly resemble that of a species of *Deuterocampta*.

Doryphora brunneostriata, n. sp.

Greenish æneous; the lower joints of the antennæ, the palpi, and the tarsi fulvous; head and thorax flavous, with brownish stripes and spots; elytra subremotely and semi-regularly punctured, flavous, with nine more or less interrupted brown longitudinal stripes. Length, 12 mill.

Head sparingly and finely punctured, flavous, with two brownish stripes in shape of a triangle; the labrum, palpi, and the lower four joints of the antennæ fulvous, the other joints of the latter black, flattened, but rather elongate; thorax three times broader than long, the lateral margins rather rounded and slightly widened in front, the anterior portion strongly produced in front of the eyes, the surface remotely and irregularly punctured; the ground colour flavous, the punctures piceous, the middle of the disc marked with two oblique brown stripes, which, starting from the anterior margin, nearly unite at their ends, and are joined to another irregular shaped transverse band placed at the base; scutellum piceous; elytra with the most convex portion near the base, from thence to the apex strongly deflexed, irregularly and semi-remotely impressed with piceous punctures, here and there arranged in rows, flavous, the interstices marked with nine longer or shorter narrow brownish stripes, leaving the lateral margin rather broadly of the ground colour, their epipleuræ of the latter colour; the under side and the femora greenish piceous; the margins of the abdominal segments and the rest of the legs fulvous; mesosternal process long, stout, and straight.

Hab. Bolivia.

This species, of which I possess a single specimen, seems closely allied to *D. geminepunctata*, Stål, but the thorax in the latter insect is much more strongly punctured, and without the brown stripes; the elytra are regularly geminate-punctate, and their narrow stripes are interrupted anteriorly and posteriorly by a flavous transverse band. For all that, it is possible that the present species is an extreme aberration of Stål's insect, taking into account the great variability of all these insects.

Doryphora ænea, n. sp.

Metallic greenish black below, above obscure æneous; thorax very finely and rather closely punctured; elytra obsoletely and finely punctate-striate, the interstices irregularly and sparingly punctured. Length, 10 mill.

Head finely and somewhat closely punctured, semi-opaque, æneous, the labrum fulvous anteriorly; antennæ extending to the base of the elytra, greenish black, the lower two joints fulvous below; thorax scarcely three times broader than long, the sides nearly straight, the anterior angles not much produced; the disc opaque, brownish æneous, punctured like the head, the extreme basal margin with some rows of stronger punctures; scutellum smooth; elytra wider at the base than the thorax, widened towards the middle, finely punctured in ill-defined rows, the interstices sparingly and very finely punctured and aciculate; the under side and legs more shining and impunctate; the mesosternal process short, but strongly pointed and straight.

Hab. Peru.

A rather small-sized species, allied to *D. prasina*, Erichs., but of rather opaque æneous upper surface and different sculpture.

NOTES ON THE SEASON OF 1897.

By Russell E. James.

Although rather late in the day, the following notes on the past year may perhaps interest some of your readers. 1897, as I found it, has been a most irregular year; and although I have not had as much time as usual for collecting, the results of the few expeditions I have made have been curiously inconsistent.

One thing has struck me throughout the year, and that is the great dearth of geometers. What beating I have done for them has invariably met with but little success, the comparative scarcity of common species being even more marked than the absence of good ones. With the exception of great Jubilee festivity, when to display their patriotism Noctuæ swarmed to the feast for full three weeks or more, treacle has also been a total failure; but while the revelry lasted such numbers turned up as I have never before seen equalled, excepting perhaps in the autumns of 1892 and 1893.

I had no opportunity of working the sallows this year, but my cousin, Mr. W. J. Ogden, who was at Bournemouth at the end of March, met with little success. In an afternoon's trip from there to Brockenhurst he obtained larvæ of *Thera variata*, *T. firmata*, and *Ellopia fasciaria*, and an odd imago of *Xylocampa lithorhiza* from the pines, but neither *Trachea piniperda* nor larvæ of *Boarmia abietaria*. A number of *Xanthia* larvæ from a large sallow all proved to be *silago*, while from the same bush in 1896 all the *Xanthias* taken were *cerago*. These latter had turned out a very nice lot, including both var. *flavescens* and some fine orange forms. Therefore, anticipating another variable series from the 1897 larvæ, I was disappointed at their all producing a strictly typical lot of *silago*. Both years a few *X. ferruginea* were mixed with the others.

At Waldringfield, in Suffolk (April 16th–26th), the same pine-feeding larvæ were again beaten, but far more backward than those from the New Forest; and from ash a fine lot of *Cirrhœdia xerampelina* were obtained, some forty odd of various sizes. These were beaten after dark from the apparently bare twigs both of full-grown trees and hedgerow saplings, and fed up fairly well on the large buds until the latter broke into leaf; some died, but enough were left for a good series in September. Little else was taken here but a few *Lycæna argiolus*, and one *Trochilium apiformis* larva which was killed in getting out.

During May I did no collecting whatever, and very few things came to light around home.

I first tried treacling on June 4th at Chingford, and the result was only one single moth, but that a very fine *Cymatophora ocularis*, evidently just out, with the rose-blush fresh on the wings; a very few *Cidaria russata* and *Acidalia remutata* at dusk were all I saw besides, and things seemed very backward altogether. Two days later eleven *Xylophasia scolopacina* larvæ were found by searching the grass with a lantern at Highgate, where the species still lingers in the old Church Bottom Woods, although very locally even in that limited area. An odd specimen also of the moth turned up there at treacle in July.

Late in the afternoon of June 14th I ran down to Darenth, returning home by the 9.25 train from Greenhithe. Everything was still behindhand, and beating was most disappointing. I thrashed along all the hedges from Dartford to the wood, and hardly a moth of any sort did I disturb, the only one worth taking being a fresh *Phibalapteryx vitalbata*. In the wood itself things were almost as bad, and after two hours' hard work I had only boxed odd specimens of *Ephyra porata*, *Tephrosia extersaria*, *T. punctulata*, *Platypteryx falcula*, *Bapta temerata*, and *Lomaspilis marginata*. However, after dark lots of moths were flying along the clematis-covered hedgerows, and over the campions in the fields. I had only a very short time before the train went, but among other things I took a fine lot of *Mamestra anceps*, some *Phibalapteryx tersata*, and *Neuria saponariæ*, the latter at blossoms of *Silene inflata;* such lots of things were on the wing that I regretted 9.25 being the last train home. Just as it was arriving I took a male *Arctia villica* flying round the lamp in the passage under the line, and on the same day I had another brought me from Southend, taken at a Sunday school treat.

Then came the Jubilee, which I took advantage of to get a couple of days at Hailsham, travelling down on Saturday afternoon, and returning on Monday evening to be ready for the procession on Tuesday, for which I had a seat. Hard beating through the woods during the daytime was very poorly repaid, but at long intervals *Halias prasinana*, *Eurymene dolabraria* (two only), *Asthena luteata*, *Acidalia subsericeata* (several), *Panagra chærophyllata* (common but local), and *Platypteryx falcula* turned up, but little else, and very few common things; while many regular Abbott's Wood species, such as *Melitæa athalia*, *Melanippe hastata*, *Gnophria rubricollis*, and others were totally absent. Very little was flying at dusk, and odd specimens of *Hepialus hectus*, *Halias prasinana*, *Calligenia miniata*, *Angerona prunaria*, *Cleora lichenaria*, *Acidalia subsericeata*, and *Timandra amataria* were the best of a poor lot. Treacling was the feature of the visit, when common things swarmed to the tune of thirty, forty, fifty, or even more on every tree, with a fair sprinkling of better species. The best of the lot was *Diphthera orion*, but there was considerable variety, of which the following form the principal:—*Leucania comma* (very abundant and fine), *Xylophasia hepatica* (very common, often four or five on a tree at once), *X. rurea*, *X. anceps*, *X. lithoxylea*, *Apamea gemina* (six), *Miana strigilis*, *M. fasciuncula* (both in profusion), *Grammesia trilinea* and var. *bilinea* (two of the latter), *Rusina tenebrosa*, *Agrotis exclamationis* (in vast numbers and some nice forms), a single *Noctua plecta*, *N. festiva* (abundant and in great variety), *N. c-nigrum*, *Hecatera serena*, *Aplecta herbida* (fairly common, but some rather worn), *A. nebulosa* (abundant), a few each *Erastria fuscula*, *Hadena adusta*, *H. genistæ*, and *H. thalassina* (worn), and a fine variable series of *H. dentina*, from pale whitish grey to dark smoky black. I did no larva-beating, but in the hedges *Bombyx neustria*, *Diloba cæruleocephala*, and *Liparis auriflua* were very conspicuous, an odd full-grown larva of *Eriogaster lanestris* also turning up, but not any of the nests of the latter species.

I took very few species worth noting at Crouch End during the summer. *Apamea ophiogramma* occurred sparingly during July, and on the 10th of the same month I took *Acidalia imitaria** on a gas-lamp, surely a curious species for a North London suburb. But it is strange how odd species turn up now and again; last year close to the same spot I took a fine *Anaitis plagiata*, also on a lamp. *Sesia tipuliformis* occurred on June 30th. Having no currant bushes now in our garden, I have not seen this species here for some eight or nine years, but formerly, when we had a garden with a lot of currant bushes, it was very common in company with *S. myopiformis*. Probably in old gardens both species still occur freely in North London.

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* This species used to be fairly common at Mill Hill.—Ed.

While the treacling was still on, I had a most successful evening at Benfleet (July 1st), when, on my way to Southend, where I was staying the night, I met Mr. Whittle of that town. He had been in the reed-beds, but I had been treacling palings on the other side of the station. The palings were as full as the trees at Hailsham had been, and there was quite as large a variety, although very different species. The best insects boxed were some nice forms of *Agrotis exclamationis*, *A. corticea* (one male and three females), *A. suffusa*, *Leucania lithargyria*, *L. comma*, *L. straminea* (one only), *Mamestra anceps*, *M. albicolon* (one), *Mania maura*, *Hadena suasa* (a very fine and variable lot), *Aplecta advena* (one very good and one worn female, from which ova were obtained), and a fine fresh *Chœrocampa elpenor*. This is the first time I have heard of *elpenor* really settling down on treacle, although frequently netted flying round. *A. corticea* Mr. Whittle said he had never yet taken in the district, but I see he records a specimen taken on July 3rd, two nights after I met him. I again visited Benfleet on the 13th, but treacle was then going off. Very few moths turned up, and those were of the very commonest. On the slopes round Hadleigh Castle, in the afternoon, *Melanargia galatea* was common and just out, but had to be walked up owing to the absence of sun. Both *Hesperia linea* and *H. lineola* were in boundless profusion at the same place, the former far the commoner of the two; but, on the other hand, the few specimens taken at rest along the sea-wall in the evening were *lineola* without exception. At dusk several nice *Acidalia emarginata* were netted, and close to the station a fine *Lithosia complana* found at rest on the grass.

Treacle at Winchmore Hill on July 8th was a dead failure, and again at Darenth Wood on the 27th, when not a single Macro came to the trees. Curiously enough, however, I cleaned my brush on a head of ragwort, and, chancing to look at this later, boxed my only two Noctuæ of the evening, viz. *Xylophasia scolopacina* and *Noctua baja*. Visions arose of a large bag had I only treacled ragwort-heads, but as the untreacled heads produced nothing, I went home with empty boxes, and had only the melancholy consolation of thinking what might have been. Another time when treacle is off, however, I shall certainly try sprinkling flower-heads. Scarcely anything flew at dusk, and beating along some three miles of hedge was as usual this year most unprofitable work. *Gonepteryx rhamni* rather startled me by dashing out of a clump of clematis about 6 p.m., and at almost the next beat out came *Lycæna argiolus.* This is the second time I have come across the summer brood of this species around Darenth, the first time being July 27th, 1887, when they were very common near Greenhithe. Little else was disturbed, but a few *Melanippe subtristata,* four *Ligdia adustata,* and one *Iodis vernaria.*

The afternoon of July 31st I had planned out for Cuxton, but unfortunately the South-Eastern Railway Company had made other arrangements, and I arrived just in time to get tea and return, after spending one hour and three quarters on Gravesend platform by the way; so I only beat a few hedges around by the station, boxing one *Larentia olivata.* It was rather foolish being caught a second time on Bank Holiday Saturday, as I was landed in a similar way at Redhill the previous year, and by the same railway company.

Part of August I spent on the Yorkshire coast, but did no collecting, except on one day (the 16th), when I took a long walk over the moors behind Whitby. In the wooded hollows *Cidaria immanata, Hypsipetes elutata,* and *Larentia didymata* were very abundant, and *Polia chi* was dotted about conspicuously on the stone walls. From the heather I picked odd larvæ of *Bombyx quercus* var. *callunæ* and *Arctia fuliginosa,* whilst on some stunted sallows almost at the top of the moors to my surprise I came across three full-fed larvæ of *Dicranura vinula,* and a large brood of *Phalera bucephala,* the latter about an inch long. Is not this a strange situation for these species? Also up on the moor a single *Argynnis aglaia* and several *Plusia gamma* and *Charæas graminis* were seen on the wing.

At Crouch End again in September *Hydrœcia micacea* turned up at light on the 1st, and *Luperina testacea* was abundant throughout the month. Three *Hepialus sylvanus* males put in an appearance all together at our front-door lamp on the 3rd, these being all I have ever seen of the species here, with the exception of one female three years ago. *Catocala nupta* occurred on the 9th, and again on the 14th, and an odd larva of *Acronycta aceris* on the 8th.

My last evening's collecting was on the 8th, down at Winchmore Hill, when only about fifteen moths came to some eighty or ninety treacled trees; these included three *Catocala nupta,* two *Asphalia diluta,* and single specimens each of *Noctua c-nigrum, Caradrina alsines, Amphipyra pyramidea,* and *Anchocelis lunosa;* and thus my year's collecting ended.

However, I received some more things from my cousin, who was down at Waldringfield during September, where he found treacle a dead failure, taking nothing better than *Agriopis aprilina* and *Hypena rostralis,* as the result of many nights' work.

Some consolation was got by the reappearance of *Sphinx convolvuli*, which had occurred there not uncommonly in 1895. Some four or five specimens were seen over the *Nicotiana* on various nights during the month, and two of them were taken, one of these being an exceedingly large female.

Larva-beating was fairly good on the whole, and the best species thus taken were *Geometra papilionaria*, *Amphidasys betularia*, *Hypsipetes impluviata*, *Platypteryx hamula*, *Ptilodontis palpina*, *Notodonta dromedarius*, *Halias prasinana*, and an imago of *Xanthia gilvago*, which was in vain kept for ova. Two *Cymatophora ocularis*, a number of *Axylia putris*, and a few *Agriopis aprilina* were the best pupæ dug, both the *ocularis* coming from oak. The several pupæ of this species that my cousin has obtained at Waldringfield in previous years have all come from under oak, none from poplar.

Autumn treacling I have had no opportunity of trying, but as on all hands I hear it to have been most unsuccessful, I may have only avoided adding another failure to a year's collecting which, with a few exceptions, has been rather a disappointing one.

I might add that the brood of *Aplecta advena* obtained from the Benfleet specimen is just now emerging, the specimens being small and poorly coloured, probably owing to the difficulty of feeding the larvæ up so late in the autumn, although at the time they seemed to feed well enough.

3, Mount View Road, Crouch End, N., Feb. 19th, 1898.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 12.)

Melanippe montanata, *Bork.*—Common everywhere. The Irish insect is of large size usually, and a considerable proportion of them belong to or approach the var. *shetlandica*, Weir, being strongly marked in pattern, with the outer margins of all wings deeply shaded with fuscous bands. Two Scandinavian examples which I possess are similarly characterised, so that it seems probable that this is a northern peculiarity. Some Irish localities, such as the shores of Lake Oughter near Farnham, produce a very handsome form, in which the transverse central band of the fore wings is beautifully waved with ferruginous, with a central shading of bluish grey, often showing round the discoidal spot, which is upon a white costal patch. The bluish tinge fades in the cabinet. The markings, however, in this species are extremely variable. The transverse band is sometimes blackish, sometimes an almost unicolorous ferruginous, without any included costal patch. Sometimes the band is very obsolete, only its edges being strongly marked. Occasionally it is narrow, and deeply constricted towards the inner margin, so as almost to divide the band in two. In some specimens the waved strigæ in the middle of the band coalesce, so as to form a series of two or three ocelli below the black central spot. The central band of the hind wings varies in strength, being occasionally absent, except traces at the inner margin.

MELANIPPE GALIATA, *Hb.*—Somewhat local, except on the coast, where it is often extremely plentiful. It varies chiefly in the colour of the transverse band of the fore wing, which is either grey marked with faint waved strigæ, or grey centrally edged with brown bands; or else wholly black, sometimes obliterating the central spot.

MELANIPPE FLUCTUATA, *L.*—Here as elsewhere one of our commonest Geometers. I know of no variation which is not present in Great Britain, and of none that prevails to such an extent as to be characteristic of our fauna.

ANTICLEA CUCULLATA, *Hufn.*—The only Irish example I have seen is a beautiful specimen taken by myself from the wall at Glenina Castle, Ballyvaughan, Co. Clare. Another was captured, I believe, by Curzon at Ardrahan, a bare limestone district of similar character about twelve miles distant in the Co. Galway.

ANTICLEA BADIATA, *Hb.*—Of frequent occurrence throughout Ireland. Numerous at Drumreaske Monaghan, Galway, and many other localities I have visited. It varies much. A very dark form sometimes occurs with the pale central band very bright and narrow. On the other hand, very unicolorous specimens occur, with only the basal strigæ and the costal portion of the dark band which usually bounds the outer edge of the pale band when present, thus closely approximating the markings of *A. rubidata.* The insect is everywhere distributed in varying abundance.

ANTICLEA NIGROFASCIARIA, *Göze.*—Not unusual, but local, and far rarer than the preceding. It varies somewhat in the width of the outer basal black band, as well as in the depth of the ground colour of the base, and the shaded areas near the apical and anal angles of the fore wing. "Common in Wicklow" (*B.*), Roebuck (*Mr. Hogan*), and Phœnix Park (Rathborne) near Dublin; Ardtully, Co. Kerry (*Miss V.*); Clonbrock (*R. E. D.*); Tempo Manor (*Langham*), and Enniskillen; Killynon, not scarce (*Miss R.*); Westmeath; Drumreaske, Co. Monaghan; Favour Royal, Co. Tyrone; Armagh (*J.*); Collin Glen, Belfast (*W.*); Castle Bellingham, not rare (*Thornhill*).

Coremia munitata, *Hb.*—Local and not usually plentiful, but widely distributed. Dark forms occur near Derry and Banagher, in which the central band of the fore wing is of dark fuscous brown, with the margins suffused internally into the ground colour. I have seen no approach to the ruddy Shetland form. Belfast (*Bw.*); Slieve Croob, Co. Down (*W.*); near Derry, locally numerous (*C.*); Drumreaske Monaghan; Favour Royal and Altadiawan, Co. Tyrone; Cromlyn (*Mrs. B.*) and Killynon (*Miss R.*), Westmeath; near Sligo (*Russ*); Toberdaly and near Banagher on the Shannon, King's Co.; Clonbrock (*R. E. D.*) and Ballinasloe, Co. Galway.

Coremia designata, *Hufn.*—Widely distributed, but somewhat local. The central band varies extremely, sometimes being proportionately as broad as that of *C. muniata*, and the edges only slightly more strongly margined with black; while others have merely a black blotch at the costa narrowing off to a broad line at the inner margin. Many have a rich purplish tinge on the central portion of the band, in others it does not differ from the rest of the wing in colour. In some, too, the black margins of the band coalesce toward the costa, enclosing a ruddy patch. I have noticed an abundant emergence of the second flight in the Co. Galway, and at Mote Park, Roscommon, about the third week of August. Abundant at Powerscourt (*B.*) and Glenchree, Co. Wicklow; Howth, Co. Dublin; Killarney and Kenmare; Clonbrook, abundant, and Ardrahan, Co. Galway; Mote Park, Co. Roscommon; Hollybrook, near Boyle; Favour Royal and Altadiawan, Co. Tyrone; Tollymore Park, Co. Down (*W.*).

Coremia ferrugata, *Clerck* (?) *L.*—In dealing with this and the following species I shall follow the careful paper of Mr. Louis B. Prout, read before the Entomological Society of London, March, 1894. This moth has a wide distribution in Ireland, but is somewhat localized. On dry slopes and banks on the edges of moors or hilly wastes it sometimes is extremely abundant. Of the varieties dealt with by Mr. Prout I have never seen the really black-banded form, though occasionally specimens with a broad dark purple band occur, like that of *C. unidentaria.* The Irish insect shows a distinctly Northern facies. For although the non-striated broad-banded forms of the South of England are represented, yet the general run are more distinctly barred with strigæ, and are more tinted with ochreous. But in several localities a strongly striated form occurs, with a very ochreous ground colour, the central band sometimes broken up with dark streaks. The extreme of this form is represented by a specimen from Tyrone, approximating closely (except in the ground colour being ochreous, and the strigæ not so sharply defined) to a Scandinavian example labelled by Sven Lampa var. *corculata*, which has a grey ground with two basal strigæ, and the middle band indicated by two waved dark lines inside, and three outside the discoidal spot; the apical angle and outer margin shaded with fuscous brown. I notice that Mr. Prout gives ab. *corculata*, Lampa, as a synonym of the type. It would, however, appear that this in an error. Another Scandinavian example is the ordinary broad-banded type, but less ruddy than the English. Mr. Prout notices that the striated form occurs only as an aberration in England, though here it is distinctly local at Altadiawan in Tyrone, where Mr. M. Fitzgibbon took a good series in my company, also in places in Monaghan, Westmeath, and Sligo. It is variable, however, within limits, and I cannot say if it is referable to var. *salicaria*, Haw., which Mr. Prout appears to think may have been an extreme striated form of the Rannoch type. He considers some of the Irish forms referable to var. *linareäta*, Gn. As to the character of the middle band, which is in some cases broad at the costa and narrowed towards the inner margin, the inconstancy of the species precludes the possibility of defining a variety from this alone, as every gradation occurs, short of the form *coarctata*, Warren, in which the attenuation is extreme, and which I have never met with. Borkhausen's *spadicearia* occurs with us. A very fuscous example, perhaps similar to the one 555 figured by Wood (of which I have here no copy), was taken by me at Favour Royal. The fore wings are almost a unicolorous fuscous brown, with the broad band and twin spots hardly to be distinguished. The hind wings also are very dark. I am of opinion that this species is more frequently met with in Ireland than the following. Kippure Mt., Co. Wicklow; Cappagh, Co. Waterford; Kenmare and Killarney; Clonbrock, Merlin Park, and elsewhere in Galway, not rare; near Sligo; Killynon, Co. Westmeath; Farnham, Cavan; Drumreaske, Monaghan; Favour Royal and Altadiawan, Co. Tyrone, plentiful; Armagh, and the shores of L. Neagh (*J.*); Enniskillen (*A.*) and Tempo Manor (*Langham*); Castle Bellingham (*Thornhill*), &c.

Coremia unidentaria, *Haw.*—Both the black- and purple-banded forms occur, and I have found them in the same locality at Altadiawan, Tyrone, Enniskillen (*A.*), Tempo Manor, Castle Bellingham, and Ardtully, Co. Kerry. Other localities are Armagh (*J.*); Clonbrock (purple-band), Co. Galway; Killarney, do.; Donegal, do.; Cappagh, Co. Waterford (black).

(To be continued.)

TWO NEW SCALE INSECTS.

By T. D. A. Cockerell.

Lecanium perlatum, n. sp.

Female scales on under side of leaf, broad and flat, much like *L. tessellatum;* chestnut colour, smooth and shiny, surface malleate, form oblique, 7 mm. long, 7 mm. broad. Legs extremely small, about the size of those of *L. hesperidum*, of ordinary form, trochanter with a long bristle, femur only moderately stout, tibia about three-quarters the length of femur, tarsus about half as long as tibia, claw short and stout, its digitules extending considerably beyond its tip. Antennæ 8-jointed, formula approximately (23) (45) (16) (78), 4 and 5 are not much shorter than 3, 1 with a short hair, 5 with a long hair, 6, 7, and 8 each with a lateral hair (8 with two), and 8 with three terminal hairs, one very long. Dermis brown, with large oval and round glands, not reticulated. Hairs of margin extremely small and few in number. Stigmatal spines in threes, two small and one large.

Hab. Ponta Delgada, Azores; on orange trees. (Div. Ent. U.S. Dep. Agr., No. 7312.)

L. perlatum is a very distinct and interesting species. It was sent to me for study by Dr. L. O. Howard, to whom I transmitted a description. Dr. Howard informs me that he forwarded the MS. to Prof. Chaves in the Azores, who will publish it there; but for the convenience of students it is deemed wise to send a copy to a widely-read entomological journal.

Aspidiotus juglans-regiæ var. *kafkæ*, n. var.

Mr. Karl L. Kafka sends me an apparently new form of *Aspidiotus*, found on bark of *Fraxinus excelsior* in Vienna. Curiously, it approaches our American *A. juglans-regiæ*, Comst., so much so, that I propose to call it *A. juglans-regiæ* var. *kafkæ*, new var. The female scale is circular, 2½ mm. diam., flat, very dark grey or blackish, exactly the colour of the bark; exuviæ subcentral or sublateral, covered, orange-reddish. Removed from the bark the scale leaves a white mark. Male scale small and elongate, about twice as long as broad. Female insect like *juglans-regiæ*, but glandular thickening at inner base of median lobes larger than or as large as that at outer base; the rounded orifice, which in *juglans-regiæ* is close to thickening of outer base, is in *kafkæ* beneath or just laterad of thickening of inner base; the median lobes in *kafkæ* are a little further apart, and hardly so produced as in *juglans-regiæ*. Five groups of ventral glands, median 2 or only one, caudo-laterals 9, cephalo-laterals 10. First row of transversely oval glands, starting at the depression laterad of the second lobe, of 6 orifices; second row of 12; third row of 12; fourth row of 5 or 6; an inner row, starting beneath the interlobular interval, is, excepting the first two, only represented by a few very small and rudimentary orifices.

Mesilla Park, New Mexico, U.S.A., Jan. 4th, 1898.

NOTES AND OBSERVATIONS.

International Congress of Zoology.—We have received various notices and lists of committees relating to the above; also the following:—"*Memorandum.*—At the Meeting of the International Congress of Zoology at Leyden in 1895, it was agreed that the Fourth Congress should be held in Great Britain, and that the President should be Sir William Flower, K.C.B., F.R.S. Some time since the Permanent Committee of the Congress accepted an invitation to assemble at Cambridge, in August, 1898. At a General Meeting of British Zoologists, invited by Sir W. Flower to confer as to the best means of making this Congress a success, it was announced to our great regret that the state of the elected President's health made it imperative for him to resign. It was proposed that his place should be taken by the Right Hon. Sir John Lubbock, Bart., and this proposal has met with the unanimous approval of the Permanent Committee of the Congress. —John Lubbock, *President.*" Further particulars may be obtained from Professor F. Jeffrey Bell, 3, Hanover Square, London, W.

Two Aberrations of Lycæna (Polyommatus) ægon.—(1). A fine and fully scaled female example captured by me on Dunyeats Hill, near Poole, in June, 1893 (the exact day I have unfortunately lost), differs from the typical form in the following particulars:—The usual brown pigment of all the wings is absent from a space triangular in shape; on the fore wings the base of the triangle extends from the anterior angle to the third median nervule, and the apex reaches to the discoidal spot; within this space all the usual orange marks are absent. On the hind wings the base of the triangle extends from the second median nervule to the second subcostal nervule, and the apex of the triangle reaches the discoidal spot. The usual orange marks are very bleached, though not absent. (2). The row of spots in the outer marginal cells of the fore wings have a tendency to coalesce and extend towards the base of the wings. This specimen was captured at the same time and place as the last-described insect. It is slightly damaged.—W. Parkinson Curtis.

Epione parallelaria in Scotland.—It may be interesting to know that in a collection of local Lepidoptera temporarily formed by the members of the South of Scotland Entomological and Natural History Society from their cabinets, and exhibited at an entomological exhibition held by them in 1895 at Galashiels, *Epione parallelaria* (*vespertaria*) was represented by two fine specimens.

The Rhopalocera of Birmingham and District.—With reference to my note on the above (*ante*, p. 42), I find that I have accidentally omitted *Vanessa c-album* from that list. It is generally distributed. and was much more frequent than at present. The examples that I have taken are chiefly of the pale form. It is sometimes seen in suburban gardens.—Augustus D. Imms; "Linthurst," Oxford Road, Moseley, February 4th, 1898.

Sphinx convolvuli Larvæ in Winter Confinement.—The larvæ referred to were hatched from a batch of thirty eggs deposited by a moth on Sept. 14th, 1897, which I recorded (Entom. xxx. p. 270). It being late in the year, it was necessary to retard the hatching of these ova if possible, so they were placed away in a cold room. Seven days later (Sept. 21st), on looking into the box, it was found that thirteen larvæ had already emerged; they were then about three-sixteenths of an inch long. *Convolvulus arvensis* was supplied to the larvæ, which they readily ate. A peculiarity which I have not before noticed was that they spun long webs over their food. On Oct. 14th the first moult took place, and this resulted in the death of four. They now resembled their congener *S. ligustri** in miniature, only the stripes were very much paler. The second moult occurred on Oct. 27th. The pale green was now replaced by a variegated brown, culminating into black, the lateral markings being a creamy white, the spiracles a light red, and each segment having a light yellow spot, with the exception of the first, second, and last, which had them concurrent. The anal horn (previously black) now had a white streak on each side. This change claimed three more, leaving only six living larvæ. Nov. 8th, third moult, followed by a day of inertia. Up to this time the larvæ had been feeding well on both *C. arvensis* and *C. soldanella*, but there was much difficulty in procuring these plants now, as they were mostly over, so the local florist had orders to force the seeds of both these bindweeds. A most trying time had come, both to the breeder and larvæ, as they now measured three and a quarter inches, and of course required more food. I must not omit to state, after this moult they varied much in colour; the usual brown type was much darker, whilst one was a rich black, whereas several might be considered like that depicted by Barrett. Eventually the forced seedlings arrived, they (the larvæ) having been without food for nearly twenty-four hours. On placing their food before them, they nibbled off the green leaves, never stopping until they had devoured the juicy stalks to the root. *C. affinis* they would not touch; but, strange to relate, endive, when offered them, they would instantly clasp and devour. I tried this vegetable through mention being made of it by Mr. Lucas in his book on the Sphingidæ. The same gentleman, in a letter to me (Sept. 22nd), rather despaired as to the possibility of success in rearing this insect. December being more unpropitious than the other months made the larvæ (now full-grown) more susceptible to its changes; the result being that two more succumbed on the 12th and 14th. On the former date two went under the earth in a flower-pot, leaving two, both having ceased to eat and roam about. These eventually turned in on the 16th, without having completed their fourth moult, it having required exactly eighty-six days from the hatching to the commencement of pupation. I unearthed the first two cocoons Dec. 18th; one was so thin that it fell to pieces on touching it, the other was very thick, like that of *Acherontia atropos* but not so large. This contained a lively pupa, which could only have taken this form a few hours. A day or two afterwards I looked at the other two, and found they had burrowed only two inches, where they remained dead, and without having attempted to make cocoons. Mr. W. Henry Barton, who acknowledges that the game is not worth the candle, can claim to have surmounted the difficulty. Although successful, he is only awarded a small average of one-eighth per cent.—H. W. BELL-MARLEY; Ravenscourt Park.

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* *Ligustri* is not now regarded as congeneric with *convolvuli*. The former is the type of *Sphinx*, Linn., and the latter of *Protoparce*, Burm. Kirby, however (Cat. Lep. Het.), sinks *Protoparce* in *Phlegethontius*, Hübn., of which he indicates the type to be *sexta*, Joh.—Ed.

[The following excerpt from "Abstract of Proceedings of the South London Entomological and Natural History Society," 1896, p. 29, may be of interest in connection with the above:—"Mr. Sturt exhibited specimens of *Sphinx convolvuli* which he had bred in December and January from the larvæ sent him from Cornwall (Proc. 1895, p. 57). Mr. Tutt remarked that Mr. Sturt deserved great credit for getting his *S. convolvuli* through, and he was, he believed, the first British lepidopterist who had reared the insect from the larva to the imago. Some years ago Prof. Poulton got the larva through to the late autumn, and proved that the insect passed the winter in that stage. . . . Mr. McArthur said that men who worked in potato fields often brought in the pupæ of *S. convolvuli*, as well as those of *A. atropos*."—ED.]

PORTHETRIA (OCNERIA) DISPAR IN AMERICA.—From the latest report of the State Entomologist concerning the extermination of the gipsy moth (*Porthetria dispar*) in Massachusetts (Bull. No. 11), we learn that something in the way of a check has been effected. The cost up to the present time has been nearly 800,000 dols. It would appear, however, that unless a further large sum is available for continued operations during the next few years, and without any interval, all the work that has been done during the past six years will be lost.

GYNANDROMORPHOUS HEMEROPHILA ABRUPTARIA.—At a meeting of the Entomological Society of London held on February 2nd last a specimen of *H. abruptaria* was exhibited which was female in character so far as concerns the wings and right antenna; the left antenna, however, was strongly pectinated. Several dark examples of the same species were also shown.

THE GENUS EREBIA.—We are requested to state that the specimens of the genus *Erebia* exhibited by Mr. H. J. Elwes, F.R.S., in illustration of his remarks at the last meeting of the Entomological Society of London will, by arrangement with Sir William Flower, Director of the British Museum (Natural History), be on view at that institution for a few weeks. The series contains, almost without exception, representatives of all the known species and more prominent varieties, and should be seen by all students of this difficult and interesting genus.

Entomology in Tirah.—Though for some years I have ceased to covet butterflies, they still have a keen interest, and I thought that as probably no one else was interested much in entomology in Tirah, where I have lately been, perhaps these very scanty notes may be of use from a hitherto unvisited country. General elevation of Maidan about 5000 ft. A plateau, intersected by numerous ravines, surrounded by hills up to about 12,000 ft. Trees: pine, walnut, apricot, apple, pear, and others a few. On November 2nd an Indian variety of our little "Queen of Spain" was common on the Sampagha Pass, a little faded; possibly *Argynnis issæa*. In the same place, and frequently in Maidan itself, a fine grayling *Aulocera* (? possibly) was seen wherever the barren ground they frequent was present. In Maidan a clouded yellow of rich colour was fairly common; and less seldom another species of *Colias*, or a variety corresponding to *Colias edusa* var. *helice*, was seen, but I did not get an opportunity of seeing one settled. The clouded yellow was possibly *C. fieldii*. A few of a *Pieris*, I believe *mesentina*, and occasionally a smart small copper something like *Chrysophanus pavana*, but apparently ruddier. I make no pretence of identifying those I saw or of having noted much, as one was nearly invariably under fire when out from camp, the inhabitants being hostile to entomology or any other pursuit in their country, and I should not venture to offer these if I thought any one else had made any entomological notes. I send you a pupa from Maidan, which, if it hatches, will probably be the first specimen from Tirah.—K. Dingwall; 1st Gordon Highlanders, 3rd Brigade, Tirah Field Force, December 31st, 1897.

[We have great pleasure in publishing the above communication. The pupa referred to has not come to hand unfortunately.—Ed.]

Pyrameis carye var. muelleri. — Mr. Beverly Letcher, of San Francisco, describes an aberration of *P. carye* as var. *muelleri* in the February number of 'Entomological News' (ix. p. 38, pl. iii.). Of this aberration, which in some respects is similar to *P. cardui* var. *inornata*, Brams., only eight examples are known, one of which was taken by Mr. Letcher in 1892, and another in 1897.

The Ragonot Collection of Micro-Lepidoptera.—We understand that this collection has been presented to the Paris Natural History Museum by Madame Ragonot.

Experimental Treatment of Araschnia levana, L.—In a paper entitled "Die Uebergänge von *Araschnia levana*, L., zu var. *prossa*, L., und die bei der Zucht anzuwendende Kältemenge" ('Entomologische Nachrichten,' xxiv. pp. 37–52), Herr G. Wilh. Ruhmer, gives a detailed account of the results obtained in a series of temperature experiments with this species.

Naturæ Novitates.—We have received from Friedlander & Sohn, of Berlin, the first number of a periodical bearing this title, which it is proposed to issue every fortnight at a small subscription. The purpose of the publication is to keep the student of natural history or of the exact sciences up to date in the matter of the current literature of all countries. In the present number there are 1537 entries, and eighty of these relate to entomology.

CAPTURES AND FIELD REPORTS.

Macroglossa stellatarum in January.—As an instance of the extraordinary mildness of the season at the present time, on Monday, Jan. 31st, I noticed a specimen of *Macroglossa stellatarum* on the wing. It was flying along some palings in a sheltered spot, occasionally alighting and basking in the sunshine.—T. B. Jefferys; Bath, Feb. 2nd, 1898.

Notes from North Staffordshire in 1897.—Collecting here in the spring during the past season was very unproductive up to the beginning of June, no doubt owing to the prevalence of cold winds. Sugar, also, was almost useless; many times in July and August, when the nights were warm and cloudy, it was an absolute failure, hardly an insect visiting the trees.

During February *Dianthœcia capsincola* and *Halias prasinana* emerged in the breeding-cage. March.—*Anisopteryx æscularia* and *Dicranura vinula* (bred). April.—Nothing of importance was observed. May.—*Tephrosia crepuscularia*, *Cidaria suffumata* (common), *Euplexia lucipara*, &c. June.—*Cœnonympha pamphilus*, *Anthocharis cardamines*, *Pieris napi*, *Sesia tipuliformis*, *Rumia cratægata*, *Asthena candidata*, *Eupisteria heparata*, *Cabera pusaria*, *Fidonia atomaria*, *Abraxas grossulariata*, *A. ulmata*, *Lomaspilis marginata*, *Larentia pectinitaria*, *Melanippe tristata* (very abundant), *M. montanata*, *M. fluctuata*, *Eubolia palumbaria*, *Anaitis plagiata*, *Notodonta camelina*. On June 26th *Acronycta leporina* was taken at rest on a birch-tree (at roots of same tree in February, 1896, a pupa of *Notodonta dictæoides* was taken), *Miana fasciuncula*, &c. July.—*Argynnis selene*, *Uropteryx sambucata*, *Metrocampa margaritata*, *Crocallis elinguaria*, *Boarmia rhomboidaria*, *Acidalia remutata*, *Halia vauaria*, *Larentia didymata*, *Hypsipetes elutata* (very common and variable), *Coremia munitata*, *C. propugnata*, *Thyatira batis*, *Apamea oculea*, *Agrotis exclamationis*, *Plusia festucæ* (two specimens reared from larvæ taken in June). On Aug. 23rd *Oporabia filigrammaria* was fairly common on the moors, together with *Larentia cæsiata* and *L. didymata*, the latter in hundreds. *Camptogramma bilineata*, *Cidaria russata*, *C. immanata*, *C. testata*, *C. populata*, *C. fulvata*, *C. pyraliata*, *Eubolia mensuraria*, *Xylophasia scolopacina* (was netted at dusk on Aug. 9th), *Luperina testacea*, *Cloantha solidaginis* (was common on the moors, resting on pine-trunks and walls, and as it rests with its wings folded round its body it presents a very curious appearance, and is difficult to see). September.—*Thera variata*, *Anchocelis rufina*, *A. litura*, *Xanthia silago*, *Miselia oxyacanthæ*, *Agriopis aprilina*, *Phlogophora meticulosa*, *Amphipyra tragopogonis*. October.—*Oporabia dilutata*, *Xanthia ferruginea*. November.—*Pœcilocampa populi* (bred from pupa found at roots of ash in September).—J. & W. Hill; 7, Westwood Grove, Leek, Staffs., Feb. 10th, 1898.

Caradrina ambigua at Truro.—I spent part of last August in the neighbourhood of Truro and took some Caradrinæ at sugar, which have turned out to be *C. ambigua*. Is not this a new locality?—George C. Hart; Woodside, Howth, Co. Dublin, Feb. 1st, 1898.

[This species was recorded as "somewhat common" in Devon last year (Entom. xxx. 305), and specimens are mentioned from South Devon in the same volume, p. 327.—Ed.]

Pieris rapæ in early January.—Jan. 7th was a bright sunny day—quite spring-like. When out for a walk I found a male *P. rapæ*, alive, but sluggish. Whether it had just emerged from pupa or not I cannot say. I could find no empty pupa-shell anywhere near. It lived in a butterfly vivarium out in my garden for about a fortnight, but a frosty night was fatal to it just when I had begun to speculate on this butterfly passing the winter in a torpid state, at least when the cold was not too severe.—Albert H. Waters, B.A.; Devonshire Road, Cambridge, Feb. 10th.

Light-traps in 1897.—The past season, bad in every respect, was much below the average for light-traps. Early in the season the winter moths occurred in much the same numbers as usual, though *Hybernia leucophæaria* and *Anisopteryx æscularia* were rather scarce. Later on *Nyssia hispidaria* was fairly common, Tæniocampæ all scarce, as were also the two Tephrosias, *bistortata* and *biundularia*, though the second brood of the former occurred plentifully in July. The Boarmias were scarce, and hardly any var. *conversaria* were taken; *Aventia flexula* almost absent, and *Cleora glabraria* entirely so. The autumn work was disastrous, *Asteroscopus sphinx* occurring in far less numbers than usual, and in poor condition. From October to December *Pœcilocampa populi* occurred in profusion, and was quite the moth of the year.

The following are additional records for the trap:—*Thecla quercus* (*Vanessa atalanta* also occurred for the second time), *Lithosia griseola*, *Nemeophila russula* (male and female), *Neuria reticulata*, *Triphæna comes*, *Dianthœcia cucubali*, *Phytometra viridaria*, *Gnophos obscuraria*, *Abraxas sylvata*, *Ligdia adustata*, *Eupithecia subfulvata*, *Aglossa pinguinalis*, *Scoparia cratægella*, *Nomophora noctuella*, *Ebulea crocealis*, *Perinephele lancealis*, *Spilonota roborana*, *Sciaphila chrysantheana*, *Batodes angustiorana*, *Pœdisca corticana*, *P. solandriana*, *Scardia arcella*, *Depressaria arcuella*.—E. F. Studd; Oxton, Exeter.

SOCIETIES.

Entomological Society of London.—*February* 2*nd*, 1898. Mr. G. H. Verrall, Vice-President, in the chair. Mr. L. C. Chawner, of Forest Bank, Lyndhurst; Mr. F. A. Heron, B.A., of the British Museum (Natural History); Mr. Henry Stebbing, of The Shawe, Jarvis Brook, Tunbridge Wells; and Mr. E. J. Burgess-Sopp, of Saxholme, Hoylake, Cheshire, were elected Fellows of the Society. A letter was read from the Secretaries of the International Congress of Zoology, calling attention to the meeting to be commenced at Cambridge on August 23rd, and extending to the Fellows of the Society the cordial invitation of the Executive Committee to be present. The Secretary also read a letter from Mr. A. D. Michael, of 9, Cadogan Mansions, S.W., asking if any entomologists, who might find insects attacked by mites (*Acari*) among their disused boxes, would be willing to send him such insects, with the mites still on them or accompanying them, or at least the mites themselves, with the name of the insect given in all cases, for the purpose of his forthcoming monograph of the Tyroglyphidæ. Mr. J. W. Tutt showed a fine series of forms of *Hemerophila abruptaria*, Thunb., captured and bred by Mr. W. S. Pearce at Holloway, varying from the normal colour, through mahogany-brown to dark fuscous, some of the specimens of the second brood showing a purplish hue. One gynandromorphous example was shown, with the wings and right antenna of the female type, the left antenna being strongly pectinated. He also exhibited two specimens of *Dianthœcia luteago*, bred by the Rev. F. Lowe, from larvæ obtained in Guernsey, and of a very distinct character, having a tendency to the ochreous coloration of the type-form, but being differently marked. On behalf of Mr. Heyne, Mr. Jacoby exhibited a series of temperature-varieties of Lepidoptera. Mr. G. H. Carpenter read a paper by himself and the Rev. W. F. Johnson on "The Larva of *Pelophila borealis*," describing its structure and life-history. On the larval characters the species, hitherto considered as of doubtful relationship, was regarded as being closely allied to *Elaphrus*. Papers were communicated by Mr. F. D. Godman, F.R.S., and Mr. O. Salvin, F.R.S., on "New Species of American Rhopalocera," and by Mr. M. Jacoby, "On Some Phytophagous Coleoptera (Eumolpidæ) from the Islands of Mauritius and Réunion."

February 16*th*.—Mr. G. H. Verrall, Vice-President, in the chair. Mr. G. C. Champion exhibited specimens of *Isodermus gayi*, Spin., from the Straits of Magellan, and *I. planus*, Er., from Tasmania, both found by Mr. J. J. Walker. The genus *Isoderma*, belonging to the Aradidæ, afforded an interesting case of geographical distribution, the only known species occurring in Chili, Australia, and Tasmania. Mr. C. O. Waterhouse referred to the similar distribution of other species of insects, which went to support the theory of a former connection between South America and Australia. Mr. Champion also showed an example of *Bagous lutosus*, Gyll., from Sweden. This insect had been on the British list since the time of Stephens, but possibly in error, as all the examples he had seen in collections were wrongly so named. Mr. Jacoby exhibited a pair of the singular weevil, *Apoderus tenuissimus*, Pasc., from the Philippines. Mr. Burr exhibited species of Orthoptera, of the family Eumastacidæ, resembling dead leaves. This was the only family of Acrydiidæ in which such resemblances were found. Dr. Chapman exhibited a specimen of *Zygæna exulans* with six wings, the supernumerary pair arising between the normal left fore wing and the corresponding leg on the same side. The uppermost wing appeared normal in every respect, the second was a reduced copy of the basal half of a fore wing, and the third a portion of crumpled wing-structure. Mr. O. E. Janson exhibited a pale variety of the rare *Papilio mikado* taken in S. Japan. Mr. Tutt showed a variety of *Enodia hyperanthus* taken by Mr. F. H. Day near Carlisle, and banded on the under side like a *Cœnonympha;* also two moths from the same neighbourhood, which, after careful comparison, he regarded as females of *Hydrilla palustris*. This sex was almost or quite undiscovered in Great Britain, and the occurrence of the species so far from the Fen district was remarkable. Mr. H. J. Elwes read a paper entitled "A Further Revision of the Genus *Erebia*," which was illustrated by the exhibition of examples of every known species. Tracing the geographical distribution, he stated that the principal European centres of the genus were the Pyrenees, and especially the Alps, only a few forms occurring in Scandinavia, while the Ural Mountains and Caucasus were almost destitute of species. The genus became abundant in E. Siberia, from which region the few N. American forms appeared to have been derived. Dr. Chapman also read a paper "On the Species of the Genus *Erebia*, a Revision based on the male Appendages," illustrated with drawings of these organs in about sixty species. In connection with the above papers Mr. Tutt exhibited and made remarks on long series of *Erebia nerine*, *E. glacialis*, *E. euryale*, *E. ligea*, &c., chiefly from the Alps.—W. F. H. Blandford, *Hon. Sec.*

South London Entomological and Natural History Society.—*January* 13*th*, 1898.—Mr. R. Adkin, F.E.S., President, in the chair. Mr. Adkin exhibited minor varieties of *Pararge megæra*, and contributed notes thereon. Mr. W. G. Pearce brought a series of very dark *Hemerophila abruptaria*, bred from ova laid by a female captured in North London. The Secretary read a paper communicated by Professor A. Radcliffe Grote, A.M., entitled "The Wing and Larval Characters of the Emperor Moths," and exhibited the following species in illustration:—*Saturnia pavonia*, *Aglia tau*, *Automeris io*, *Hemileuca maia*, *Citheronia imperialis*, and *Attacus speculifer*, kindly lent by Mr. C. G. Barrett.

January 27*th*, *Annual Meeting.*—The President in the chair. Reports of the satisfactory condition of the Society were read from the Council and Treasurer. The balance in the Treasurer's Report was somewhat smaller than usual, owing to the first part of the 1897 Proceedings being printed in the current year. The following Officers and Council were then elected:—President, J. W. Tutt, F.E.S.; Vice-Presidents, R. Adkin, F.E.S., and W. Mansbridge, F.E.S.; Treasurer, T. W. Hall, F.E.S.; Librarian, H. A. Sauzé; Curator, W. West; Hon. Secretaries, Stanley Edwards, F.L.S., and H. J. Turner, F.E.S.; Council, T. A. Chapman, M.D., F.E.S., F. Clark, A. W. Dennis, A. Harrison, F.E.S., F.C.S., W. J. Lucas, B.A., R. South, F.E.S., and H. Tunaley, F.E.S. In his address the retiring President dealt at length with matters concerning the well-being of the Society, summarized the entomological work of the past year, referring in detail to the more important works which had recently been published, and then passed on to a general consideration of the bearing of the theory of evolution on our views of nature. Mr. Lucas exhibited a specimen of the earwig, *Forficula lesnei*, taken at Reigate in October, 1897, by Mr. West (Greenwich), of which only two specimens had previously been recorded in Britain, and contributed notes on its structure habits and occurrence. [See p. 49.]

February 10*th*.—Mr. J. W. Tutt, F.E.S., President, in the chair. Mr. E. J. Crow, of Brixton, and Mr. E. R. Hillsworth, of Stratford, were elected members. It was announced that Mr. Mansbridge had resigned, owing to his leaving England, that Mr. Tunaley, F.E.S., had been chosen to fill the vacancy as Vice-President, and that Mr. H. Moore had been elected on the Council. Mr. McArthur exhibited underside varieties of *Lycæna* (*Polyommatus*) *bellargus* and *L.* (*P.*) *corydon*, the latter being almost devoid of ocelli. Mr. Dennis, three parts grown larvæ of *Callimorpha hera* from ova sent by Mr. Tutt while collecting in the Alps in 1897. They had fed all the winter. Mr. Tunaley, long bred series of *Retinia resinella* from Aviemore. Mr. Routledge, a variety of *Epinephele* (*Enodia*) *hyperanthes* from Carlisle, having a broad whitish submarginal band on the under sides of the hind wing embracing the ocelli; and also two females of *Acosmetia caliginosa*,* taken in the same locality by Mr. Day. Mr. Lucas, imagines and living nymphs of *Calopteryx splendens* from Fleet, and contributed notes on the specific characters and habits of the nymphs. Mr. Adkin, specimens of *Dianthœcia luteago* var. *barretii*, from Howth. Major Ficklin, a form of the same species taken in Cornwall, which Mr. Tutt had named var. *ficklini*. Mr. Tutt, on behalf of Rev. F. E. Lowe, of Guernsey, a third form bred from pupa taken under *Silene maritima*, and which he had named var. *lowei*. A considerable discussion ensued on the singular variation shown in this species, practically invariable in the same locality, but each locality possessing a distinct race. Mr. Tutt also exhibited, on behalf of Mr. Lowe, a fine aberration of *Melanippe sociata*, in which the central band of the wings was almost completely obliterated; and on behalf of Mr. Pearce, of Hackney, all the melanic specimens of *Hemerophila abruptaria* bred by him during the last three years, some dozens, including extremes and intermediates, and one partially gynandrous specimen.—H. J. Turner, *Hon. Rep. Sec.*

Birmingham Entomological Society.—*December* 20*th*, 1897.—Mr. G. T. Bethune-Baker, President, in the chair. Mr. E. J. Denham, 31, Hugh Road, Small Heath, was elected a member. Mr. R. C. Bradley, showed *Hadena glauca* and *Anaitis plagiata*, from Sutton; and *Ephestia kühniella*, from his office in Digbeth. Mr. P. W. Abbott, a nice little series of *Cymatophora fluctuosa*, taken in Wyre Forest, last June, rather pale in colouring; also a specimen of *Sesia culiciformis* with a white band, also from Wyre Forest; this last was a dark-black looking specimen, darker than usual, excepting the band, which was white. Mr. C. J. Wainwright, a box full of Aculeate Hymenoptera, including four male specimens of *Odynerus lævipes*, from Wyre Forest, a rare insect, which, however, seems well established in that locality; *Andrena humilis*, a male from Wyre Forest, and some wide-banded vars. of *Apis mellifica*, from Eisenach, Thuringia. Mr. A. H. Martineau remarked that Mr. E. Saunders gives as a character of *O. lævipes* yellow patches on both hind pairs of legs, but on all the Midland specimens he has seen they were on the middle pair only. Mr. Martineau showed sticks containing the cells from which he had bred several *O. lævipes*, from Malvern; also sticks containing cells of *Pemphredon lugubris*, *Anthophora fucata*, Panz, and *Osmia leucomelana*. Mr. G. T. Bethune-Baker, two drawers of Pieridæ, containing a fine series of *Anthocharis*, including *A. pechi* from Algeria, and other rare species, and the genera *Zegris*, *Leucophasia*, &c.

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* *Hydrilla palustris*, ante, p. 72.—Ed.

January 17*th*, 1898.—The President in the chair. Mr. R. C. Bradley showed *Therioplectes solstitialis*, taken before 8 a.m., hovering in the road opposite his house at Sutton. Mr. A. H. Martineau showed a set of specimens illustrating the life-history of *Andrena cineraria*, L.: larvæ young and full-fed, pupa, pupal skin, cells, and male and female. Mr. P. W. Abbott, a series of *Bryophila glandifera* from Devon, one very beautiful specimen being of a much richer and more beautiful green than usual, with the markings softened considerably. Also a *Lycæna ægon* with the red marks gone from right upper wing, and blue shadings over them all; and a *L. bellargus* (female), also shot with blue; both from Midhurst, Sussex. Mr. G. T. Bethune-Baker, two drawers of the genus *Colias*, from his collection, containing many rare species.

February 7*th*, *Annual Meeting*.—Mr. G. T. Bethune-Baker in the the chair. The Annual Reports of the Council, Treasurer, and Librarian were received, and the Officers and Council elected, Mr. G. T. Bethune-Baker being elected President; Mr. P. W. Abbott, Vice-President; Mr. R. C. Bradley, Treasurer; Mr. A. H. Martineau, Librarian; and Mr. C. J. Wainwright, Secretary, Mr. P. W. Abbott exhibited *Hemerophila abruptaria*, one of the ordinary pale form, from Sutton Park, the remainder from North London, all more or less dark; one of these latter was taken on the door of a coal-cellar, and was very dark, quite evenly suffused with dark umber, with the black transverse markings clear, and a trace of some of the light lines showing; the remainder were bred by Mr. W. A. Southey, and one of them was as dark as the caught one, the others showing the usual arrangement of colours and markings, but being generally darker; the thoraces remained light in the darkest specimens. Mr. R. C. Bradley showed *Diodontus tristis* (a male and two females); one *Pemphredon lethifer* (male); one *Psen pallipes* (female); and *Sphecodes pilifrons* (male), all from Sutton, 1897.—Colbran J. Wainwright, *Hon. Sec.*

Lancashire and Cheshire Entomological Society.—*Annual Meeting*, *January* 10*th*, 1898.—The following officers were elected:—President, Mr. S. J. Capper; Vice-president, Mr. B. H. Crabtree; Joint Secretaries, Messrs. F. N. Pierce and the Rev. R. Freeman; Hon. Treasurer and Librarian, Mr. H. Locke. The members of the Council elected were:—Mr. W. E. Sharp, Dr. J. W. Ellis, F.E.S., Rev. A. M. Moss, Dr. H. Bailey, and Mr. F. C. Thompson. The following candidates were elected by ballot:—F. M. Saxby, D. Armstrong, E. G. Isaac, Albert Tipping, and William Perkins. In the course of the evening the President, Mr. Samuel J. Capper, F.L.S., F.E.S., a veteran naturalist, delivered his annual presidential address. It was a very exhaustive and interesting treatment of entomological subjects. He remarked that the past year had left an encouraging record, The papers read at the Society had been excellent, and the discussions most interesting, while at the same time the number of members had increased. They should have liked to have seen a more regular attendance at all the monthly meetings, for while some had been crowded, others had been quite the reverse. Dealing with entomological literature, the President said that previous to the last few years that class of literature had been almost wholly devoted to systematising; and further, the various systems of classification that had from time to time been brought out had been nearly always based upon imaginal structure; the earlier stages of the insects, until quite recently, were greatly overlooked. In entomology, as in all other sciences, the specialist had been developed. From the host of specialists now at work, generalisations on a sound basis might be formed, and in fact were now forming; and although it might appear at first sight to be making "confusion worse confounded" to have to unlearn much that had been taught by former masters in science, they must remember that the words of Tennyson, "The old order changeth, yielding place to new," applies as much to entomology as it does to other matters, and that the end and aim of all science should be truth. Latterly the spread of evolutionary ideas, with their influence on all scientific thought, had directed entomological literature into an entirely new channel; and, guided by this light, the true relationship of species is sought. What is said of entomology applied to all branches of Natural History. The Linnean system of botanical classification, though wonderfully ingenious, had long since given way to what is styled the natural arrangement. The periodical literature of entomology played an important part in the progress of the science, and, more than anything else, had helped to make it a popular study. In conclusion, in speaking of scientific literature, Mr. Capper said they would gratefully acknowledge what the Board of Agriculture had done by the publication of separate reports and leaflets, and by papers in the 'Journal of Agriculture.'

Entomological Club. — Meetings of this Club since last report (Entom. xxx. 96) were held as follows:—

1897.—July 7th: Loanda, Beulah Hill, Upper Norwood; Mr. Samuel Stevens in the chair. August 12th: Trent House, Burton-on-Trent; Dr. Philip B. Mason in the chair. November 24th: Wellfield, Lingard's Road, Lewisham; Mr. Robert Adkin in the chair.

1898.—January 18th: The Entomological Salon, Holborn Restaurant; Mr. G. H. Verrall in the chair.

RECENT LITERATURE.

Publications issued by the U. S. Department of Agriculture, Division of Entomology:—

Revision of the Tachinidæ of North America: a Family of Parasitic Two-winged Insects. By D. W. Coquillett. Pp. 154. Washington. 1897. (Technical Series No. 7.)

Proceedings of the Ninth Annual Meeting of the Association of Economic Entomologists. Pp. 87. Washington. 1897. (Bulletin No. 9, New Series.)

The Gipsy Moth in America: a Summary Account of the Introduction and Spread of Porthetria dispar in Massachusetts, and the Efforts by the State to Repress and Exterminate it. By L. O. Howard. (Bulletin No. 11, New Series.)

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NOTES ON LEPIDOPTERA FROM THE MEDITERRANEAN.

By Fleet-Paymaster GERVASE F. MATHEW, R.N., F.L.S., F.Z.S., &c.

WE left Plymouth on Sept. 6th, 1896, in H.M.S. 'Endymion,' *en route* to the Mediterranean, with a new crew to recommission H.M.S. 'Hawke' at Malta. On the afternoon of the 8th we called at Vigo, and remained there until five p.m. the following day. The next morning I landed after breakfast with one of my messmates, and went for a long walk by the road which leads out to the north-east of the town, and runs just above and parallel with the beautiful harbour. As soon as we got clear of the town and suburbs, we passed gardens and vineyards and small fields containing Indian corn, melons, tomatoes, &c. Grape-picking and wine-pressing were in full swing. The slopes of the hills facing the harbour were cultivated for about two-thirds of their height, but above this the ground became poor and rocky, and more or less overgrown with pine trees. Numerous ravines intersect the hills, and we crossed several bridges during our walk. The day was fine, bright, and delightful, and after proceeding for some four miles or so we turned up one of the ravines, the sides of which in many places were thickly clothed with Spanish chestnut, poplars, oaks, and a few fir trees; while in the more open spots there was a profusion of heath, broom, wild sage, sun-cistus, &c. *Pieris daplidice*, *Colias edusa*, and *Pararge megæra* were plentiful, and in fine condition; *Lycæna telicanus* was flying about heath, and *L. argiolus* over bramble. Once or twice I saw a brilliant copper, probably *Polyommatus virgaureæ*, but not having a net with me I was unable to secure a specimen; now and then *Pyrameis atalanta* passed along, and these, with one or two *P. cardui*, *Pieris rapæ*, and *P. brassicæ*, comprised all the butterflies I noticed at this place.

We arrived at Malta on Sept. 17th, turned over to the 'Hawke' on the 18th, and left again on the 22nd to join the Levant Division of the Mediterranean Fleet at Lemnos, where we arrived on the 25th, and remained until Oct. 5th. It rained heavily for two or three days during our stay. Oct. 2nd was fine and bright, and I went on shore early in the day, and strolled about the hills near the harbour. The country was rather bare of vegetation at this time of year, the ground was very rough and stony, and the walking difficult, and moreover it was intolerably hot. In some of the little valleys there was a certain amount of vegetation, composed mostly of scrubby bushes of a prickly nature. I saw *P. cardui* in abundance, and a few *C. edusa*, *L. icarus*, *P. phlœas*, *Deiopeia pulchella*, and *Nomophila noctuella;* and upon fennel there were a few larvæ of *Papilio machaon.* It was, however, too late in the season to expect much. I dare say in the spring some interesting species might be found here.

We arrived at Salonica on Oct. 6th. This important place is situated upon extensive slopes at the head of a deep bay. The old part of the town was formerly surrounded by a high wall, 36 ft. thick, a considerable portion of which still remains. Behind the town, particularly to the eastward, there is a series of lofty hills, many of them clothed with thick forest; and away in the distance, to the south-west, facing the town, is the mighty Mount Olympus. As we steamed up the bay, on our left hand we passed a large extent of flat marshy ground. From what I could see of the country, I should imagine that it would be a capital place for collecting in during the spring and early summer months, but while we were there it was not possible to get about much on account of the dangerous and unsettled state of the country. We were not allowed to go outside the town except in parties of four or five together, and then we had to go armed. We remained at this place until Oct. 23rd, and while there, in the neighbourhood of the town, I took or noticed the following:—

Pieris brassicæ, *P. rapæ*, and *P. daplidice.* Common.

Anthocharis belia. A few.

Colias edusa. Common and fine.

Pyrameis cardui. Abundant. Larvæ plentiful, feeding between spun-up leaves of mallow.—*P. atalanta.* Common.

Lycæna bœtica. One.—*L. telicanus.* Abundant.—*L. icarus.* Abundant.—*L. astrarche.* Abundant; a fresh brood.

Polyommatus phlœas. A few.

Deiopeia pulchella. Common.

Plusia gamma. Common.—*P. daubei.* One.—*P. chalcytes.* Several.

Mecyna polygonalis. Several. Larvæ common and gregarious, feeding upon a species of *Cassia.*

Nomophila noctuella. This species swarmed on board at night, attracted by the electric lights.

On Oct. 10th I went by rail with a shooting party to a place called Karasuli, about thirty miles from Salonica, and was surprised to see some worn specimens of *Argynnis pandora* still on the wing. I believe there must be two broods of this species during the summer, for I remember meeting with it as late or later than this some years ago at Chanak, at the mouth of the Dardanelles.

We left Salonica on Oct. 23rd, and arrived at Salamis Bay on 26th. The hills to the north of this bay are clothed with pines, with an undergrowth of sage, sun-cistus, heath, and a variety of aromatic shrubs. Walking was extremely difficult, as the ground was covered with large blocks of volcanic stone with nasty jagged edges. From Salamis I made several excursions to Athens, Eleusis, &c., and noticed larvæ of *P. cardui* plentiful in the Acropolis, crawling over fallen marble blocks; and in a shady corner I took a beautiful fresh *Plusia chalcytes* sitting on a mallow-leaf, having just emerged from its cocoon, which was spun up beneath.

We left Salamis Bay on Nov. 13th, and reached Poros at 2 p.m. the same day. Poros is a small island just off the mainland, with which it forms almost a land-locked harbour. There is a small town and naval yard. The country is very bold and mountainous, and the slopes of the hills and ravines are clothed with scrub composed of wild olive, arbutus, ilex, "wait-a-bit" thorns, sun-cistus, plane trees, &c. At one end of the harbour there is an extensive plain with marshy patches here and there. It looks a nice country for collecting in, and no doubt a number of good insects might be found here in the spring and early summer. During our stay I noticed *P. rapæ* and *P. brassicæ* very abundant; *C. edusa*—a small form—plentiful, with several var. *helice; Cœnonympha pamphilus, Pararge egeria* var. *egerides* —the English form; and the larvæ of *Mecyna polygonalis* plentiful upon *Cassia*. The following is a description of it:—Head shining black, mouth pale yellow; a broad greyish blue dorsal stripe followed by a broad shining black stripe, and then a broad yellow stripe, which includes the spiracles; under parts greenish brown; upon each segment there are three or four small shining black warts, each of which emits a fine whitish bristle; legs black. In confinement, when full-grown, the larvæ spun tough cocoons of fine white silk among the leaves of their food-plant, in which they changed to rather elongated reddish brown pupæ. They are handsome larvæ, and are easily seen, as they are gregarious and feed quite exposed upon their food-plant. The first moth appeared on Dec. 5th, the second on Jan. 14th, and the remainder between the latter date and March 9th—a nice little series.

We left Poros on Nov. 22nd, and after stopping for a day at Argostoli, in the island of Cephalonia, proceeded to Malta, where we arrived on the 25th; and here we remained until April 1st, 1897. Malta is not a place where one would expect to find a great variety of insects, for upon approaching it from the sea during the greater part of the year it looks anything but inviting to an entomologist, as it presents a dried and burnt-up appearance, and, with the exception of a few carob trees, there is nothing to relieve the monotony of the stone walls and brown soil. Even in the winter and spring months it is difficult to believe that so much is grown upon the island, for upon travelling along the road you see scarcely anything but the stone walls that surround the fields. But take the train to Citta Vecchia, and walk up to the old town that stands upon one of the highest points of the island, and turn back towards Valetta, and you will then look down upon a large expanse of country under cultivation. Every foot of ground that can be utilized has a crop of some sort upon it. The fields are small and divided by stone walls of from four to six feet high. This is to protect the crops from the prevailing winds which are frequent and strong during the winter and spring. February and March are the months to see the island at its best; then the fields are green with corn, potatoes, beans, &c., and some of them are scarlet with the flowers of a species of clover, called by the natives "sulla" (*Hedysarum coronarium*), which forms valuable fodder. Here and there you will notice patches of a bright primrose-yellow, which is caused by the flowers of an *Oxalis*, a most pernicious weed, which grows nearly everywhere. It is a delicate-looking flower upon rather a long weak stalk, and it is a pretty sight to see a large mass of this waving to and fro in a gentle breeze. It dies away altogether during the hot season, but is one of the first weeds to spring up after the autumn rains.

The central part of the island is more or less flat or undulating, with hills towards the coast-line, and it is divided in many places by valleys or "weids" which run towards the sea. Some of them are tolerably wide and deep, and are well protected from the winds, and in several of them, particularly at Boschetto, Zurrico, &c., there are beautiful orange gardens, which are delightful and favourite places for picnics. The "weids" running down from Boschetto under Verdala Palace, the governor's summer residence, past Siggieni and Zebbug out on to the Marsa, and another near Birzubbugia were my favourite hunting grounds. Here from the end of October to the end of March plenty of wild flowers are to be met with. Two or three kinds of sweetly-scented narcissus, a small purple crocus, a yellow tulip, grape hyacinths, anemones, scarlet pheasant's eye, various heaths, and a number of others. The only indigenous trees are, I think, the carob and wild fig. There are a few bushes—a stunted *Rhamnus*, upon which the larvæ of *Rhodocera cleopatra* feed, brambles, and some other low shrubs the names of which I do not know. Upon the tops of many of the hills, where the soil is thin and the ground very stony, there is no attempt at cultivation, and here, as well as in some places that are reserved by the Government, there are quantities of asphodel which flower from December to February, and spiked star of Bethlehem. The upper part of the large bulb of the latter is usually above ground, and it throws out thick fleshy leaves in the winter and spring months, but they die away in the hot weather, and in September and October the plant sends up a single tall stem, three or four feet high, which terminates in a long spike composed of innumerable small white flowers, which at that time of year, when everything around is dead and parched up, have rather a singular and conspicuous appearance.

I will now give a rough list of the Lepidoptera I met with at Malta between November, 1896, and December, 1897 :—

Papilio machaon, L.—Is to be met with between the middle of March and end of October in small numbers. There appear to be a succession of broods, and it is usually most plentiful in April and May. The larvæ are to be found upon fennel, which grows rather commonly about the island, but is mostly dead or dried up by the end of October, so I do not know what becomes of ova deposited by females that are then on the wing. It is possible that the eggs do not hatch until the following March, or the perfect insects may hybernate, although I do not think this is likely, as it would be contrary to the usual habits of the species. Maltese examples of this butterfly are large and dark.

Pieris brassicæ, L. — Abundant, and may be frequently seen on warm days during the three winter months. The females of the early autumn brood have the tips of their anterior wings broadly black, and the black spots are much larger than in those of the earlier broods.

Pieris rapæ, L.—Abundant, and occurs throughout the year. Some of the females of the autumnal brood are of a deep olive-yellow.

Pieris daplidice, L.—Common but local. Observed on Nov. 25th a fresh specimen on the slopes above Calcara Gate, where it was tolerably numerous during the first fortnight of March, 1897, at which period I noticed the females depositing their eggs on the under sides of the leaves of the wild radish. Another brood was on the wing on July 18th, upon which day something caught my eye as I was passing a small plant of wild yellow antirrhinum, and upon stooping down I saw it was an example of this species. I tried to box it, but it was too quick for me and flew off, and, after flying round and round for several times, it returned and pitched on the same flower. I again tried to box it, and again failed, when it repeated the same manœuvres, alighting again on the same flower; but this time I succeeded in boxing it. It was late in the afternoon, and the butterfly had evidently selected this particular flower for its resting place for the night; the colour of its hind wings harmonized well with the green and greenish yellow of its surroundings. The next day I noticed several flying on the slope above Calcara Gate.

Colias edusa, F.—Common throughout the year, and the var. *helice* occasionally seen.

Rhodocera cleopatra, L.—Rather scarce, but occurs all over the island, particularly in the "weids," or rocky valleys, where its food-plant, a stunted thorny buckthorn, grows, and upon which I have seen the females depositing their eggs in February and March.

Polyommatus phlæas, L.—Abundant. Seen in December, January, and February. At the end of July, 1897, it was swarming in several localities, and the specimens were very large and dark—the var. *eleus* of Fabricius.

Lycæna bœtica, L.—Rare; only one or two met with.

Lycæna astrarche, Bgstr.—Common and typical. The July brood the most numerous.

Lycæna icarus, Rott.—Abundant. First noticed March 5th. In July it was swarming in certain places, and this brood was much larger and much more strongly marked than those seen in the early part of the year. In some cases the males have three or four conspicuous black spots on the hind margin of the posterior wings, near anal angle, and the narrow black marginal line is as wide and distinct as in *L. ægon*; the spots on the under sides are very large, black, and broadly ringed with white, and the marginal series of orange-peacock spots are bright and large. The females are large, have no vestige of violet, but are as dark as *L. astrarche*, and for some time I thought I was taking that species; their under sides are exactly the same, except for the addition of the two basal spots on the fore wings. It is a very distinct variety. The violet in the wings of the females of the spring brood is very slight.

Vanessa atalanta, L.—Common.

Vanessa cardui, L.—Abundant. Larvæ on thistles, and spun up between leaves of mallow.

Pararge megæra, L.—Common, and there seems to be a succession of broods throughout the year; those met with during December and January are smaller and darker than the spring and summer broods.

Pararge egeria, L.—Common but local. A succession of broods. Some of the examples very richly marked. Orange gardens at Boschetto, gardens of St. Antonio Palace, "weid" near Zurrico, &c.

Epinephele ianira, L., var. *hispulla*, Hb.—Common but local, occurring in the "weids," St. Antonio Gardens, &c. First noticed on July 10th, but it was probably out much earlier than that date. I was not at Malta during April, May, or June. They remained a long time on the wing, as I observed them well on into October. Some of the females I have taken are very large bright specimens.

Cœnonympha pamphilus, L. — Abundant. The spring and early summer broods are the typical form, but at the beginning of July the var. *lyllus*, Esp., appears, and is much more plentiful than the type; some of the females taken are very large and strongly marked.

Deilephila euphorbiæ, L.—Abundant in the larva state. A succession of broods from May to October. Full-fed larvæ were found on July 10th, and small larvæ, only just hatched, were seen as late as Dec. 4th, but it is doubtful if these latter would ever attain full growth, for they would hardly be able to stand the rain and cold nights that were then setting in. The parent moths do not seem to exercise much judgment in depositing their ova, for I often noticed three or four young larvæ upon a small plant not more than three inches high, and no other plant within a hundred yards of them; in many instances again I have seen several small larvæ upon a diminutive plant, while large robust plants close at hand had none on them. They suffer a good deal from the attacks of enemies; centipedes and carnivorous beetles prey upon them at night. I used to watch certain larvæ to note their rapidity of growth, &c., and often when I visited them again nothing but their shrivelled-up skins remained.

Macroglossa stellatarum, L. — Abundant. One afternoon in the Floriana Gardens I saw more than a hundred flying before the flowers of a small evergreen privet. It was a very pretty sight. They are also very partial to the flowers of the lantana.

Emydia grammica, L.—One specimen.

Deiopeia pulchella, L.—Not common.

Arctia villica, L.—One crushed larva upon a road near Zurrico.

Euprepia pudica, Esp.—This is a common species. The perfect insect appears from July to September, and I have taken it sitting on walls, &c. The larvæ feed on various kinds of grass, and may be found in waste places under stones from the beginning of December until the middle of March, when they are full-grown. The larva is pale smoky brown tinged with red; upon each segment there are six raised shining black spots emitting fascicles of stiff bristles, those in the centre dark brown, the outer ones reddish; three of these spots are situated above, one just behind, and the remaining two are just below the spiracles; the dorsal stripe is rather broad and pale yellowish brown, and is followed by a pale smoky stripe mottled with darker blotches, and below this a pale straw-coloured stripe which includes the spiracles, and extends to the ventral surface; head dark brown with a paler V-shaped mark above the mouth, which is black; legs and prolegs reddish brown. The skin is shining, and the larva feels hard to the touch; it curls into a ring when annoyed, and remains in that position for a considerable time. When full-grown the larva spins rather a tough cocoon composed of whitish silk and pieces of grass, and does not change to a pupa until a week or two before the moth emerges. When we left Malta on April 1st I had about thirty cocoons, and the first moth appeared on July 19th, at which time the larvæ in the remaining cocoons were still unchanged.

Spilosoma fuliginosa, L.—Not uncommon. A full-grown larva, taken on Dec. 31st, produced a large dark female on Jan. 30th. On March 8th I took a female sitting on a stone; on the 13th of the same month another female flying in the hot sun; and I have upon several occasions noticed the remains of the moths lying on the roads.

Cossus ligniperda, F. (?).—I have smelt the larvæ of this species frequently, though I have not as yet met with the perfect insect.

Psyche sp. ?.—Larva-cases abundant, but I have not succeeded in breeding any of the moths.

Bombyx trifolii, Esp. (?).—Larvæ of what I take to be this species were abundant from January to March, but I did not breed any, though several of my larvæ spun cocoons. On Oct. 25th I took a male at rest on a wall. It is certainly not like our English species, as it is of a uniform brown, with very indistinct fascia, and is probably referable to Guenée's *iberica*.

Agrotis upsilon, Rott.—One specimen.

Polia sp. ?.—During December and January a very handsome larva was by no means uncommon feeding exposed upon various flowers, especially those of a sweet-smelling narcissus. In October I bred several of the moths, and they appear to come very near *Polia xanthomista*, Hb., var. *nigrocincta*, Tr., although the larvæ do not agree in any way with Buckler's description. I will defer giving any description of the larva until I have ascertained what the moth really is.

Calocampa exoleta, L.—Larvæ common in January and February, feeding exposed upon a variety of wild flowers.

Plusia gamma, L.—Common.

Acontia luctuosa, Esp.—Common.

Thalpochares ostrina, Hb.—Common.

Thalpochares parva, Hb.—Common.

Metoptria monogramma, Hb.—One example.

Sterrha sacraria, L.—Common.

Anaitis plagiata, L.—Several.

Cidaria bilineata, L.—Common.

Eupithecia pumilata, Hb.—Several bred.

Botys ferrugalis, Hb.—Common.

Nomophila noctuella, Schiff.—Abundant.

I did no night-work, or the above list would no doubt have been much longer.

(To be continued.)

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 64.)

Camptogramma bilineata, *L.*—Extremely numerous everywhere. It presents every shade of variation from the bright yellow form, with almost obsolete waved transverse lines, and the pallid ab. (and var.) *testaceolata*, Stdgr., which occurs on the limestone districts of Clare and Aran, to the black variety *isolata*, Kane. Most of the variations occur with the type everywhere; but var. *testaceolata* and the banded aberration appear to be somewhat topomorphic; while the var. *isolata* is a local form. A paper dealing with this subject appeared in the 'Irish Naturalist' of March, 1896, to which I would refer for fuller details. Succinctly stated, the following is the gist of my researches on the variation of this species. The form with the margins of the median band, especially the outer one, shaded with fuscous and sometimes edged with black, which I call the "banded aberration," is found very widely both in Ireland and Great Britain; but is occasional and somewhat scarce, and is rarely localised. It appears in company with clouded forms like those from Unst on the margins of bogs in Connemara near

Glendalough, Aasleagh, and elsewhere. This local tendency to dark scaling I attribute to adaptation to a moorland environment, as here it appears to be in process of establishment as a local variety. On the dark, bald cliffs of Kerry, at Dursey Island and the neighbouring mainland, a very dark form occasionally occurs, more melanic than the Unst specimens, the fore wings being of an almost unicolorous fuscous brown, and the hind wings of an ochreous brown—ab. *infuscata*. Upon a rock islet, a considerable distance from the Kerry coast, where a sparse vegetation of thrift creeps up the slopes between the rocks, I discovered the var. *isolata*, but fear it has since disappeared, though then fairly numerous. The continuous Atlantic storms of the winter of 1893–4 soaked the shaven sward with deluges of sea-water to such an extent that it withered away in spring. This melanic form I consider owed its origin to protective adaptation coupled with complete isolation. The close herbage affording no refuge for imagines (which probably were of the mainland race already tending toward dark aberrations), they had to rest on the dark rocks; and the paler specimens no doubt fell a prey to the birds and bats. Thus a stable melanic variety arose, and became constant by in-breeding. Among a large number taken on this islet on two occasions not one approached the ordinary coloration, but were uniform in their black hue. The following is a description of this interesting form:—Var. *isolata*. With all the wings of a sooty black, upon which the waved strigæ and median band are marked in darker tone. The hind wings in some instances are shot with a yellowish tinge. The body and under side of the wings are also of sooty black. The size is above the average, which is a proof that the dark scaling is not a result of dwarfing or diseased conditions.

CAMPTOGRAMMA FLUVIATA, *Hb.*—I have only occasional captures of this moth to record. It does not seem to be anywhere numerous, though perhaps this may be due to ignorance of its habits, and the appropriate method of capture. Howth and Malahide (*B.*); Limerick (*T.*); Timoleague, Co. Cork (*D.*); Clonbrock, Co. Galway (*R. E. D.*); Markree Castle, Co. Sligo; Derry and Cushendall (*C.*); Ballycastle, Antrim.

PHIBALAPTERYX TERSATA, Hb.—A single worn specimen of this species was taken in a garden at Howth, August 21st, 1891, by Mr. Maurice Fitzgibbon. Whether a casual importation or introduced with shrubs there is no means of judging; but so far the capture is unique in Ireland.

PHIBALAPTERYX LAPIDATA, *Hb.*—The late Stephen R. Fetherston-H., a friend of Birchall, was the first to discover this insect in Ireland. He took it in some numbers on the range of moorland belonging to his brother at Glenmore near Crossmolina, Co. Mayo, where I have since met with it. It can be taken at light, as well as in the daytime, and probably exists in many other similar situations in Ireland; as subsequent captures by Mr. Watts on the hills near Belfast; at Leenane, Connemara, by Lieut. Walker, R.N., and Chapman (E.M.M. xxv. p. 213); and Lissadell, Co. Sligo, by Mr. Vivyan;—show a very wide range of distribution.

PHIBALAPTERYX VITTATA, *Bork.*—This insect has undoubtedly a wide range, though it seems to have escaped the notice of many collectors in Ireland. For some years I only met with occasional examples; until on the banks of the Shannon near Banagher, and at Belleisle, Co. Fermanagh, I found it very numerous. Mr. Watts reports it equally abundant in the marshes about Belfast. Other localities are as follows: Co. Wicklow (*Bw.*); Lough Oughter near Farnham, Cavan; the Geragh (Macroom) and Cork (*S.*); Moycullen, Connemara, and Clonbrock, Co. Galway; Favour Royal, Co. Tyrone; Castle Bellingham (*Thornhill*).

PHIBALAPTERYX VITALBATA, *Hb.*—As the food-plant *Clematis vitalba* is not indigenous to Ireland, but has been introduced into demesnes and pleasure-grounds, we cannot claim this species as Irish. Nevertheless, as in the case of *P. tersata* at Howth, a single specimen is recorded fron Clonbrock, Co. Galway, by the Hon. R. E. Dillon. I have, however, a note of its common occurrence at Mallow, but not having seen an example give it with reserve.

TRIPHOSA DUBITATA, *L.*—Kingstown (*Greene*); Howth, not rare; also specimens have come to the lantern of Rockabill Lighthouse off the Dublin coast. It is also found on the Co. Louth coast at Castle Bellingham (*Thornhill*); and at Greystones, Co. Wicklow; also on the shores of Lough Foyle near Derry (*C.*). At none of these coast localities, to my knowledge, is buckthorn found; and therefore the food-plant is probably blackthorn. The late Mr. Fetherston-H. was of opinion that Irish examples were more richly coloured than those of Great Britain with a purple gloss. In Galway it is not rare at Ardrahan (*Miss N.*); and at Clonbrock the hibernated females are fairly numerous when beating the sallows in spring. I have not seen the var. *cinereata*, St.

EUCOSMIA UNDULATA, *L.*—Apparently widely distributed, but I have never found it plentiful. A few have been taken at the following places: Powerscourt, Co. Wicklow (*B.*); Cromlyn (*Mrs. B.*) and Cookesborough, four (*Miss R.*), Co. Westmeath; Kells, Meath (*G. V. H.*); Owencunliffe Glen, Killarney, numerous (*W.*); and near Kenmare; Glandore, Co. Cork (*D.*); Crossmolina, Co. Mayo; Markree Castle, and Rockwood near Sligo; Limavady, Co. Derry (*the late Canon Grainger*).

CIDARIA SITERATA, *Hufn.*—Throughout Ireland, and in certain localities very plentiful. The males vary in the strength of the red flush on the fore wings. The females differ in the depth of the green, which is often very rich and dark, without any red tint, and reducing the paler markings considerably in extent. Others are much paler, marbled with strigæ, and pale patches, so as in some cases to approach a strongly-marked *C. miata.* I have not seen the very dark banded female here, which is taken in the New Forest. It is useless to give more than a few localities to show the wide distribution. Dublin and Wicklow, sometimes fairly plentiful; Cappagh, Co. Waterford, not common; Mucross, Killarney, very abundant, and elsewhere in Kerry; Co. Galway, ditto; Markree and about Sligo, not very plentiful; Killynon, Westmeath, Drumreaske, abundant; Derry, scarce; &c.

CIDARIA MIATA, *L.*—Usually commoner than the preceding, and of equal range.

CIDARIA CORYLATA, *Thnb.*—Widely distributed, but somewhat local. Plentiful in some localities, but usually not numerous. It varies much in the median band of the fore wing, which is sometimes a very dark olive-brown without markings. In the lighter-coloured examples pale waved lines break up the centre of the band. A frequent variation is found in the band being much constricted towards the inner margin, in many places disconnecting the wide costal portion from the rest. In the latter form the outer edge of the band is very deeply dentated, more so than in the normal form. I have never seen the Scotch form in which the yellow crenelations are absent, except a single example in Mr. Dillon's cabinet at Clonbrock; and the var. *albocrenata*, Curt., seems absent from Ireland. Common in Co. Wicklow (*B.*) and Powerscourt; Killarney; common in parts of Galway; Markree Castle and near Sligo, scarce; Killynon, Co. Westmeath; Favour Royal, Co. Tyrone, abundant; Farnham, Cavan; Armagh (*J.*); Derry, a few (*C.*); Ballycastle, Co. Antrim.

CIDARIA TRUNCATA, *Hufn.*—Everywhere common. The Irish insect seems to be a very sober tinted form. Very rarely have I met with any of the marbled and brightly-coloured varieties seen in English collections. As might be expected, therefore, the var. *perfuscata*, Haw., is occasionally met with; also var. *commanotata*, at Clonbrock and elsewhere.

CIDARIA IMMANATA, *Haw.*—Extremely numerous everywhere; and with a wide range of variation both among the dark and handsome coloured forms var. *marmorata*, Haw., and those with white median bands. Specimens of ab. *unicolorata* also occur; but I have not seen the ab. *thingvallata*. This insect, therefore, does not seem to follow the above closely-allied species in adopting a sombre livery in Ireland, though a very dark grey form prevails on the mountains among which the river Roughty takes its rise near Kenmare, Co. Kerry. Here it would seem that the moorland surroundings and the dark rocks upon which it rests have induced adaptive coloration. I took a large series here to test the uniformity of the pattern, which was remarkable.

CIDARIA SUFFUMATA, *Hb.*—Generally distributed, and usually abundant. It varies considerably, the median and basal bands being sometimes of a very blackish brown, with a pale trait on the costa; but usually it is of lighter tint, and somewhat variegated with sinuous shading. The whitish bands on each margin of the median dark band are often darkened with fuscous, a transition stage to the var. *piceata*, St., which I have not taken.

(To be continued.)

FURTHER NOTES ON *ANDRENA*.

BY T. D. A. COCKERELL.

Andrena perarmata, n. sp.

♂. Length 9 to 10 mm., black; the head and thorax clothed with rather dense very long mouse-coloured pubescence, becoming dull white on the ventral surfaces, and black at the sides of the face and round the antennæ; some few black hairs also on the scutellum. *Head large, broader than thorax, facial quadrangle much broader than long, cheeks broad, and produced beneath into a right angle; mandibles long and slender*, ferruginous at tip, tuberculate at base, *and produced beneath at the base into a prominent tooth*, deeply notched within at some distance from the tip. Face and front dullish, *clypeus strongly and quite closely punctured*, area in front of the ocelli striate; antennæ long, reaching to metathorax, wholly dark. Thorax dull, with a minutely roughened surface, enclosure of metathorax minutely roughened and ill-defined; tegulæ shining piceous; wings hyaline, iridescent, the apices faintly dusky; *nervures and stigma brown, the stigma very dark;* second submarginal cell small; legs black, hind tarsi dark brown; pubescence of legs long, mouse-colour; anterior coxæ large, swollen in front; tarsi very slender. Abdomen shining, microscopically tessellate and hardly punctured, with thin and sparse mouse-coloured pubescence, not forming bands or concealing the surface; some short black hair, not readily noticed, on dorsum of second to fifth segments; hair of apex tinged yellowish.

Hab. Seattle, Washington (T. Kincaid). Many specimens. March 15th, 1897; March 16th, 1896.

Near to *A. mandibularis*, Rob., but that is smaller (8 mm.), with sparsely punctured clypeus and honey-yellow nervures. *A. fragilis*, Sm., differs at once by the shining thorax and pale testaceous nervures. *A. nigrihirta* (Ashm., as *Cilissa*) is also in some respects similar, but has not the peculiar head-characters of our insect. The European *A. ovina*, Kirby (male), also reminds one a little of *A. perarmata*.

In the Mesilla Valley, New Mexico, I have taken a wild bee (*Halictus pruinosus*) as early as March 18th, but it is quite the end of March before the early Andrenidæ are well on the wing. Here we have *A. perarmata* appearing at Seattle, so much further north, as early as March 15th, and in quantity!

Andrena cærulea, Smith, var. nov. *territa*.

♀. Length about 9 mm. Differs from Smith's description of *cærulea* by the quite long erect pubescence of the head and thorax being white, with some black hairs intermixed on the sides of the metathorax, and especially at the sides of the face. The pubescence of the legs is mostly sooty, but that on the anterior femora is entirely white, and the floccus of the posterior femora is pallid. The greenish fringe of the microscopically tessellate abdomen is quite marked, and the whole insect is rather of a greenish blue. The wings are hyaline, not noticeably darker at the apex, but throughout with a slightly dusky tint. Nervures and stigma dark brown, stigma pallid in the middle. There are no distinct hair-bands, but the sides of the abdomen show some shining white hairs; the venter exhibits three interrupted white hair-bands; the pubescence of the apex might be called obscure fulvous; it is a kind of pale reddish chocolate. Flagellum after the third joint brownish beneath; clypeus tessellate, and with sparse shallow punctures, its disc showing prismatic colours—purple, green, and blue. Process of labrum broad and truncate. Mesothorax dull, minutely roughened, with scarcely observable shallow punctures; basal enclosure of metathorax roughened, scarcely defined at all. Tegulæ dark chestnut colour, with some blackish hairs; some blackish hair also occurs on the sides of the prothorax.

Hab. Olympia, Washington (T. Kincaid). May 23rd, 1894.

The following table separates the females of the blue *Andrenæ* of the north-west:—

Pubescence of apex of abdomen black, of face also black . . . . *nigrocærulea*, Ckll.
Pubescence of apex of abdomen brownish, of face mostly pale.
  Pubescence of thorax ochraceous, on metathorax black . . . . *cærulea*, Sm., 1879.
  Pubescence of thorax white, the few black hairs inconspicuous . . . . . . *territa*, Ckll.

Andrena melanochroa, n. sp.

♀. Hardly 7 mm. long, black, with short and thin dull whitish pubescence, inclining to mouse-colour dorsally. Facial quadrangle broader than long; clypeus minutely tessellate, with sparse but strong punctures; vertex granular, front below ocelli very finely striate; antennæ dark, feebly tinged with ferruginous beneath towards apex; first joint of flagellum as long as the two next together; mandibles stout with bifid dark ferruginous tips; process of labrum broad, truncate with sloping sides; mesothorax dullish, minutely tessellate, hardly punctured; enclosure of metathorax roughened, scarcely at all defined; tegulæ fuscous; wings smoky hyaline, nervures and stigma reddish brown, second submarginal cell broader at top than third; legs black, with shining pale brownish pubescence; abdomen tessellate and impunctate; apical margins of segments 2 to 4 with thin white hair-bands, very broadly interrupted on 2 and 3, and narrowly on 4; apex with fulvous pubescence.

♂. Similar to the female. Face all black; pubescence longer and paler; at apex of abdomen dull white; abdomen not obviously fasciate; small joints of tarsi rufescent; wings more yellowish; stigma dull amber-colour with a dark margin.

Hab. Olympia, Washington (T. Kincaid). May 9th to 25th. This little species has the aspect of *A. ziziæ* and *illinoensis*, but has none of the greenish colour of these species. Provancher's *A. vestita*, described only in the male, must be very similar to *melanochroa*, but will be known by the somewhat smaller size and the ferruginous-red tarsi.

Andrena macgillivrayi, Ckll.

Mr. Kincaid sends two females from Washington State, one from Seattle, May 11th, the other Olympia, June 2nd. The Washington form is a little larger (long. 11–12 mm.) than the type, the stigma is somewhat darker, and the face is a trifle broader. All the essential specific characters are the same as in the New York (Ithaca) type.

Mesilla Park, New Mexico, U.S.A.

TORTRICES OCCURRING IN THE VICINITY OF THE CHESHAM LINE.

Although there are a good many species to be obtained even in the neighbourhood of the stations between the Baker Street terminus and Willesden Green, it is not until we get beyond the latter and well into the country that we need think of alighting in quest of Tortrices. There are, however, some very decent species to be found in the neighbourhood of Kingsbury and Neasden Station, and a few hours may be pleasantly and profitably spent in a ramble around, especially if we turn in the direction of the Brent and Kingsbury old church. Harrow and Pinner have each something to offer, but we shall do better at Northwood, and it is this locality and the country around Chalfont Road that I have most frequently collected in. The latter is on the chalk and well wooded. Although Mill Hill on the Midland system does not properly belong to the district more immediately under consideration, I have included it because it is not far distant as the crow flies, and it has produced several good Tortrices.

The following is a list of the species I have met with during sundry visits to the various places; but, with the exception of Mill Hill, I have rarely spent more than an afternoon at a time at any one locality. It is therefore highly probable that many more species would be found by more diligent working.

TORTRIX PODANA, Scop. = PYRASTRANA, Hübn. (*Lozotænia fulvana*, Wilk. Brit. Tort., 1859; Staint. Manual, ii. 1859. *Cacœcia podana*, Meyrick, Handb. Brit. Lep., 1896).—Widely distributed. The unicolorous form known as var. *fuscana*, St., occurs more frequently than the type in St. John's Wood. I have seen frequent instances of "assembling" in this species.

TORTRIX XYLOSTEANA, Linn. (*Lozotænia xylosteana*, Wilk. Staint. *Cacœcia xylosteana*, Mey.).—A generally common and variable species.

TORTRIX SORBIANA, Hübn. (*Lozotænia sorbiana*, Wilk.; Staint. *Cacœcia sorbiana*, Mey.).—I have only obtained this species at Northwood, but it does not seem to be very plentiful.

TORTRIX ROSANA, Linn. (*Lozotænia rosana*, Wilk.; Staint. *Cacœcia rosana*, Mey.).—A very common species throughout the whole area.

TORTRIX DIVERSANA, Hübn. (*Tortrix transitana*, Wilk.; Staint. *Tortrix diversana*, Mey.).—This species has sometimes occurred in profusion at Mill Hill and Kingsbury. It seemed to affect particular elm trees.

TORTRIX HEPARANA, Schiff. (*Tortrix heparana*, Wilk.; Staint. *Pandemis heparana*, Mey.).—Generally common, especially in the larval state.

TORTRIX RIBEANA, Hübn. (*Tortrix ribeana*, Wilk.; Staint. *Pandemis ribeana*, Mey.).—Also common, more particularly in fruit gardens.

TORTRIX CORYLANA, Fabr. (*Tortrix corylana*, Wilk.; Staint. *Pandemis corylana*, Mey.).—I have only seen this species at Northwood.

TORTRIX UNIFASCIANA, Dup. (*Lozotænia unifasciana*, Wilk.; Staint. *Cacœcia unifasciana*, Mey.).—Common almost everywhere.

TORTRIX PALLEANA, Hübn. (*Tortrix icterana*, Wilk.; Staint. *Tortrix paleana*, Mey.).—Larvæ often abundant in meadows at Mill Hill, Kingsbury, Harrow, Northwood, and Rickmansworth. The perfect insect is not so commonly in evidence.

TORTRIX VIRIDANA, Linn. (*Tortrix viridana*, Wilk.; Staint.; Mey.).—Generally abundant.

TORTRIX FORSTERANA, Fabr. (*Tortrix forsterana*, Wilk.;

Staint.; Mey.).—This species occurs throughout the whole area, but appears to be only moderately common. I have generally obtained specimens from ivy and honeysuckle, upon both of which plants the larva feeds.

TORTRIX MINISTRANA, Linn. (*Eulia ministrana*, Wilk.; Staint. *Tortrix ministrana*, Mey.).—Common. Flies rather high.

DICHELIA GROTIANA, Fabr. (*Dichelia grotiana*, Wilk.; Staint. *Epagoge grotiana*, Mey.).—Only met with at Mill Hill, but never more than two or three at a time. I used to beat it out from a hawthorn hedge under oak trees.

LEPTOGRAMMA LITERANA, Linn. (*Oxygrapha literana*, Wilk.; Staint. *Acalla literana*, Mey.).—Once met with in a lane adjoining Moor Park. This specimen was of the type form.

PERONEA SPONSANA, Fabr. (*Peronea favillaceana*, Wilk.; Staint. *Acalla sponsana*, Mey.).—Occurs, but not commonly, at Northwood and Chalfont, always among beech.

PERONEA SCHALLERIANA, Linn. (*Peronea schalleriana*, Wilk.; Staint. *Acalla schalleriana*, Mey.).

PERONEA COMPARANA, Hübn. (*Peronea comparana*, Wilk.; Staint.).—This and the preceding are found at Mill Hill, Northwood, and Chalfont. They are probably only forms of one species. Intermediates have not been met with by myself in the area here dealt with, but my series from Macclesfield, where the insects are common, comprises all the intergrades between typical *schalleriana* and *comparana*.

PERONEA VARIEGANA, Schiff. (*Peronea variegana*, Wilk.; Staint. *Acalla variegana*, Mey.).—This variable species occurs throughout the whole area.

PERONEA ASPERSANA, Hübn. (*Paramesia aspersana*, Wilk.; Staint. *Acalla aspersana*, Mey.).—One or two each year at Northwood, but the species seems confined to one spot.

RHACODIA CAUDANA, Fabr. (*Teras caudana*, Wilk.; Staint. *Rhacodia caudana*, Mey.).—Occurs at Mill Hill and Northwood, but does not appear to be common in either locality. Wilkinson gives Caen Wood, near Hampstead.

TERAS CONTAMINANA, Hübn. (*Dictyopteryx contaminana*, Wilk.; Staint. *Acalla contaminana*, Mey.).—Common in almost every hedgerow. Varies in colour from pale drab through various shades of brown to fuscous.

DICTYOPTERYX LŒFLINGIANA, Linn.; Wilk.; Staint. (*Tortrix lœflingiana*, Mey.).—Generally distributed, especially among oaks or in hedges under oaks.

DICTYOPTERYX HOLMIANA, Linn. (*Crœsia holmiana*, Wilk.; Staint. *Acalla holmiana*, Mey.).—Occurs in most hawthorn hedges, but appears to be most abundant at Mill Hill.

DICTYOPTERYX BERGMANNIANA, Linn. (*Crœsia bergmanniana*, Wilk.; Staint. *Tortrix bergmanniana*, Mey.).—Common among roses, both wild and cultivated. To obtain really fine specimens it is better to rear this species from larvæ, which are easily obtained.

DICTYOPTERYX FORSKALEANA, Linn. (*Crœsia forskaleana*, Wilk.; Staint. *Tortrix forskaleana*, Mey.).—Most maple bushes produce this species.

PTYCHOLOMA LECHEANA, Linn.; Wilk.; Staint. (*Cacœcia lecheana*, Mey.).—Generally distributed. Sometimes flies rather high, in the early evening.

DITULA SEMIFASCIANA, Haw. (*Brachytænia semifasciana*, Wilk.; Staint. *Eucosma semifasciana*, Mey.).—I took one example at Northwood in July; it was flying over a sallow bush which I was examining by lamplight.

PENTHINA CORTICANA, Hübn. (*Antithesia corticana*, Wilk.; Staint. *Eucosma corticana*, Mey.).—Occurs at Northwood among birches.

PENTHINA BETULÆTANA, Haw. (*Antithesia betuletana*, Wilk.; Staint. *Eucosma betuletana*, Mey.). — Not uncommon among birches at Northwood.

PENTHINA CAPRÆANA, Hübn. (*Antithesia capræana*, Wilk.; Staint. *Eucosma capreana*, Mey.).—Two specimens bred from sallow shoots obtained at Northwood.

PENTHINA SORORCULANA, Zett. (*Antithesia prælongana*, Guen.; Wilk.; Staint. *Eucosma sororculana*, Mey.). — I have a note referring to the capture of this species at Northwood, but I cannot find the specimen.

PENTHINA PRUNIANA, Hübn. (*Antithesia pruniana*, Wilk.; Staint. *Eucosma pruniana*, Mey.).—Common in hedgerows and also in gardens throughout the whole area.

PENTHINA OCHROLEUCANA, Hübn. (*Antithesia ochroleucana*, Wilk.; Staint. *Eucosma ochroleucana*, Mey.).—Occurs in most lanes, but most frequently met with at Mill Hill and Chalfont.

PENTHINA VARIEGANA, Hübn. (*Antithesia cynosbatella*, Wilk.; Staint. *Eucosma variegana*, Mey.).—Common everywhere.

PENTHINA SELLANA, Hübn. (*Antithesia sellana*, Wilk.; Staint. *Eucosma sellana*, Mey.). — I think this species occurs on the Midland Railway bank at Mill Hill.

ANTITHESIA SALICELLA, Linn. (*Penthina salicella*, Wilk.; Staint. *Eucosma salicella*, Mey.).—Occurs on willows and fences near Neasden.

HEDYA OCELLANA, Fabr.; Wilk.; Staint. (*Tmetocera ocellana*, Mey.).—Generally distributed. I have taken a form closely approaching var. *hippophäana* in St. John's Wood.

HEDYA ACERIANA, Dup.; Wilk.; Staint. (*Gypsonoma aceriana*, Mey.).—Common on poplars in St. John's Wood, but I have not met with it in any other part of the area.

HEDYA DEALBANA, Fröl.; Wilk.; Staint. (*Gypsonoma dealbana*, Mey.).—Mill Hill, Northwood, and Chalfont; a variable and rather common species.

HEDYA NEGLECTANA, Dup.; Wilk.; Staint. (*Gypsonoma neglectana*, Mey.).—I obtained one example of this species at Northwood.

HEDYA SERVILLANA, Dup.; Wilk.; Staint. (*Laspeyresia servillana*, Mey.).—Northwood is the only locality that I know of. I have been unable to find larvæ, and I have only one example of the moth.

SPILONOTA TRIMACULANA, Haw.; Wilk.; Staint. (*Notocelia trimaculana*, Mey.).—Generally distributed; affects whitethorn hedges.

SPILONOTA ROSÆCOLANA, Doubl.; Wilk.; Staint. (*Notocelia rosæcolana*, Mey.).—Occurs in June and July among roses, and seems to be pretty generally distributed.

SPILONOTA ROBORANA, Tr.; Wilk.; Staint. (*Notocelia roborana*, Mey.).—Also a rose feeder in the larval state, and occurs in August in most localities throughout the area.

PARDIA TRIPUNCTANA, Fabr.; Wilk.; Staint. (*Epiblema tripunctana*, Mey.).—Generally distributed.

ASPIS UDMANNIANA, Linn. (*Notocelia udmanniana*, Wilk.; Staint.; Mey.).—Generally distributed and common, but most readily obtained by rearing the moths from caterpillars which dwell singly in large conspicuous packets of bramble leaves.

(To be continued.)

NOTES AND OBSERVATIONS.

CHRYSOPA PUNCTINERVIS, McLachlan.—The range of this interesting species in the west seems to be rather wide. On August 28th, 1894, I took specimens at light at San Augustine, New Mexico, at the eastern base of the Organ Mountains. As the insect was not described in Hagen's monograph of Neuroptera, I thought it probably new; but Mr. N. Banks kindly informed me that it was *C. punctinervis*, stating at the same time that he had specimens from Brownwood, Texas, and Fort Collins, Colorado. The only other *Chrysopa* I have positively identified from New Mexico is *C. externa*, Hagen, found on alfalfa at Las Cruces, June 8th, 1894. Several other species have been provisionally identified; but they are variable, and the material at hand is not sufficient for satisfactory conclusions.—T. D. A. COCKERELL; Mesilla Park, New Mexico, Feb. 20th, 1898.

Humble-bees in New Zealand Killed by Native Birds.—In vol. xxix. p. 210, of the 'Entomologist,' I referred briefly to some enemies of the introduced humble-bees in New Zealand. In the note referred to I also stated that we had observed the introduced starlings killing and conveying humble-bees to their nests to feed their young. In concluding the article I further stated that up to that time I had no records of native birds killing the bees. Recently, however, the tui or parson-bird (*Prosthemadera novæ-zealandiæ*) has been detected killing them at Akaroa on Banks Peninsula. The case is remarkable in illustrating how new habits are acquired or family habits are developed in some species of birds when certain conditions are present. As the tui belongs to the starling family, and is one of the native honey-suckers, it is possible it also was killing humble-bees to feed its young when it discovered the honey-sac of the insects. The tui, while engaged in killing the bees, would discover their honey-sac, which would also lead to a continuance of the habit as a ready means of procuring their favourite food. An analogous case is also presented in some recently acquired habits of the starling. For two seasons I have observed what is undoubtedly an acquired taste and habit in the starling in New Zealand. Like the tui, it now frequents the flax-flats and sucks the honey from the richly mellifluous flowers. It is quite probable that the eating of the humble-bee's honey-sac by the starlings developed, or is now developing, the taste for honey in these birds. Owing to the three last successive seasons being extremely dry in the northern half of the Middle Island, there is a great scarcity of insect food, which probably impelled the birds to attack the humble-bees. In the newspaper report of the occurrence—which I am forwarding to the editor—it states that the humble-bees "are deprived of their honey-sac, the body of the insects being otherwise uninjured." In the interesting editorial footnote to my article (*l. c.* p. 212), Mr. Edward Saunders is quoted in reference to the great tom-tit (*Parus major*) killing humble-bees on lime trees. Mr. Saunders refers to the dead and dying insects as "having a large hole in the upper surface of the thorax, and another at the apex of the abdomen, the apical segments being removed." I have not seen Mr. Saunders's paper. But there seems to me no doubt that the tom-tit killed the humble-bees by extracting and consuming the viscera of the insects. It may possibly be considered that this subject is more ornithological than entomological. In my opinion honours are equal. The effects of environment on newly-introduced birds and insects presents a new field in which students of both sciences may readily observe the origin of new or acquired habits in their respective classes. Both the starling and tui are endowed with a high degree of intelligence, while anyone who has observed their habits knows their ready powers of perception. It would be interesting to know if any one of the three species of Bombi now acclimatised is more liable to attacks by the tui than the others. In some districts large areas of red clover (*Trifolium pratense*) are grown for seed, and are fertilised by two forms of *B. hortorum*. *B. terrestris* is, as it is in Europe, a destructive robber of many flowers in New Zealand. Unfortunately I live on the open Canterbury Plains, and far from the native bush where the tuis dwell, and have no opportunities of observing their habits in relation to the acclimatised Bombi.—W. W. Smith; Ashburton, N.Z., Jan. 9th, 1898.

Cnephasia cinctana not at Bloxworth.—A correspondent has lately called my attention to the inclusion of *Cnephasia cinctana* in my list of Lepidoptera taken at Bloxworth in 1895 (Entom. xxix. 132), and asks if this is correct. I am sorry to say it is not so. The species intended to be given was *C. sinuana*, which, by the printer's error (very probably occasioned by my bad writing), was made into *C. cinctana*. This last species has not, so far as I know, yet occurred in Dorsetshire; while *C. sinuana* is a rare though regularly occurring one. Not having had an opportunity to correct the press, and scarcely even running my eye over the paper after its appearance in due course in the 'Entomologist,' this error had quite escaped me, until my correspondent called my attention to it.—O. P. Cambridge; Bloxworth Rectory, Feb. 28th.

Heliothis armigera, Hb.—In reference to Mr. South's interesting notes upon this species (*ante*, p. 17) and the other recent notices of its capture (*ante*, pp. 44, 45), it may not be without interest to state that there is a rather worn example in my cabinet, which was caught by my brother flying in the sunshine over the sandhills upon the coast, about four miles south of Berwick, in September, 1882. *H. armigera* has also been taken on two or three occasions in the neighbourhood of Burnmouth and Eyemouth, to the north of Berwick, by Mr. William Shaw. —George Bolam; Berwick-on-Tweed, March 5th, 1898.

Melanippe tristata, L.—Referring to the aberration of this species mentioned by Mr. W. F. de Vismes Kane (*ante*, p. 11), I may say that I have a somewhat similar example, taken on the Northumbrian moors last season, in which the black markings are decidedly paler than usual, and the light ground colour of all the wings has a pronounced rusty tinge.—George Bolam.

The Rhopalocera of Birmingham and District.—I have been asked to make some corrections with regard to my notes on the above (*ante*, pp. 42–44). The majority of the species came under my own observation; but I have been obliged to refer to past literature for several to make the list as complete as possible. The records to which I referred were chiefly found in the 'Entomologist' and a local list of Lepidoptera; but as they are both between twenty and thirty years old they are now out of date, and several insects probably no longer occur in the district. For example: *Argynnis adippe* is recorded in the local list referred to, but locality not stated, and is certainly not known to have occurred in Sutton Park for many years; *Thecla quercus*, there is no authenticated record of its capture of late years in Sutton; *Lycæna ægon* (*vide* Newman's Brit. Butt.) has not been seen in Sutton Park for many years past. I may add that my record of *Argynnis paphia* is the first really known capture of the species in the locality mentioned of late years, as I have since heard.—Augustus D. Imms; "Linthurst," Oxford Road, Moseley, near Birmingham.

[We supposed that, except where otherwise noted, the species mentioned by our correspondent (*ante*, pp. 42–44) had been observed by himself. This appears not to have been the case, but, on the contrary, it would seem that he has incorporated ancient records, and this, too, without indicating where and when such records were published. It should not be necessary to point out that the usefulness of a local list depends upon its accuracy; but as we are obliged to advert to the fact, we may further remark that one or two misleading entries in a list considerably reduce its value, even if they do not cause the whole compilation to be regarded as worthless.—Ed.]

Migration of Anosia plexippus.—At a meeting of the Cambridge Entomological Club (Mass., U.S.A.), the President, referring to a statement made in a recent work on British Butterflies, that there was not a "scintilla of actual evidence" to support the assertion that *Anosia plexippus* migrates southward in the autumn in North America, drew attention to the fact that three specific cases are noted by Riley in his third 'Missouri Report,' p. 151; and five others are reported in Scudder's 'Butterflies of the Eastern United States,' pp. 729, 730, 1083.—('Psyche' for March.)

Naphthaline.—According to the experience of Mr. Eustace R. Bankes, as noted in the March number of the Ent. Mo. Mag., a moderate quantity of naphthaline is a useful thing to keep in cabinet drawers; but when used too liberally injury to the specimens is likely to ensue.

Pin-blacking.—I find that the preliminary processes mentioned in my former paper on this subject (Ent. Mo. Mag. vol. v., s.s., p. 252), namely, the soda-soak and rinse and the immersion in diluted nitric acid, are unnecessary, and that all that is required is to put the pins ("white") as purchased into a test-tube of suitable size, cover them with hydrosulphuric acid for a couple of minutes, and then pour off the liquid, and scatter the pins over a sheet of paper to dry. N.B.—When first turned out the pins are of a golden colour, but soon blacken on exposure to light and air. Pins prepared by this simple process possess great advantages over other black pins. Their surfaces are not liable to crack; their blackness is duller, and becomes intensified by age; they are less liable to the action of the vapour of butyric acid emitted by rancid grease; and, above all, the metal, particularly of the points, is considerably hardened. Surely for the attainment of so desirable a result the inconvenience of a few minutes' stink incurred in laying in a stock of pins of greatly improved quality, for a season or for several seasons, is hardly worth consideration.—H. G. Knaggs; Folkestone, March, 1898.

Gynandromorphous Specimen of Adopæa thaumas, Hufn.—The reference to Leech's Butt. China, *ante*, p. 52, line 1, should have been "(p. 593, pl. xl., fig. 7, male)," and not as printed.

Spring Lepidoptera.—On March 12th last I found a specimen of *Panolis piniperda* at rest on a tree-trunk at Esher, and my friend Mr. B. Prest took a male example of *Amphidasys striataria* (*prodromaria*) in Kingston.—W. J. Lucas; 21, Knights Park, Kingston-on-Thames.

Tæniocampa munda in the Autumn.—Mr. John F. Churchill (Ent. Mo. Mag. s s. ix. p. 65) records the capture of a small example of *T. munda* at ivy last autumn. This seems to be such an exceptional occurrence that we venture to ask if any of our readers have ever met with this species, or any other of the genus, in the autumn.

SOCIETIES.

Entomological Society of London.—*March 2nd*, 1898.—Mr. G. H. Verrall, Vice-President, in the chair. The following were elected Fellows of the Society :—Miss Margaret Fountaine, 7, Lansdowne Place, Bath ; Mr. J. H. Carpenter, Shirley, St. James's Road, Sutton, Surrey ; Mr. G. O. Day, Parr's Bank House, Knutsford ; Mr. F. E. Filer, 58, Southwark Bridge Road, S.E. ; Mr. R. Hamlyn-Harris, The Conifers, Hambrook, Bristol ; Mr. E. J. Lewis, 4, Elwick Road, Ashford ; Mr. T. Maddison, South Bailey, Durham ; Mr. W. H. Mousley, Orchard House, Mundesley ; and Prof. Enzio Reuter, Helsingfors, Finland. Lord Walsingham exhibited a series of the larger and more striking species of Xyloryctinæ, a subfamily of the Gelechiidæ, especially characteristic of the Australian fauna. The series illustrated the life-histories and the great disparity in colour and form between the sexes of many species. He also gave an account of the family, chiefly from notes by Mr. Dodd of Queensland, with especial reference to the habits of the larvæ, which live in holes in tree-trunks, to which they drag leaves in the night for the next day's consumption. Mr. Gahan exhibited a locust, *Acridium ægyptium* (=*tartaricum*), taken in a house in Hanover Square, and probably imported in vegetables. Mr. Kirkaldy exhibited species of water-bugs, including *Enicocephalus culicis* and *Gerris robustus*, both taken for the first time in Mexico. A discussion arose on the reported occurrence of the San José scale, *Aspidiotus perniciosus*, in Great Britain. Mr. R. Newstead stated that during nine years' work on Coccidæ he had never once met with this species among scale-insects taken in this country and sent to him for identification. It was impossible even for an expert to distinguish it, without careful microscopical preparation and examination, from among the thirty or more known species of *Aspidiotus*, and any attempt to identify it on imported fruit by naked-eye observation, or with a hand-lens, was therefore quite impracticable. The risk of its distribution by being imported on fruit was small ; there was, however, much more likelihood of its introduction on plants. At the same time, he saw no reason to suppose that it would be more injurious in this country than the common *Mytilaspis pomorum* ; in America the San José scale had several generations in the year, sometimes as many as five, but in this country it would probably conform with the habits of all other scale-insects at present investigated, and become single-brooded.

March 16th.—Mr. R. McLachlan, F.R.S., Vice-President and Treasurer, in the chair. Mr. Champion exhibited specimens of *Acanthia inodora*, A. Dugés, from Guanajuato, Mexico. This insect, a congener with the common bed-bug, was found in fowl-houses, where it attacked poultry. Mr. Wainwright exhibited a locust found alive in broccoli at Birmingham. The insect was identified by Mr. Burr as *Acridium ægyptium*. Mr. Tutt showed a series of captured examples of *Calligenia miniata*, varying in colour and the amount of black markings, one example being a clear yellow and another orange. The Secretary exhibited part of a series of holograph letters, &c., which he had discovered among old papers in the Society's Library, including communications from Kirby, Spence, Darwin, Hope, Yarrell, and many other entomologists. A paper by Mr. E. E. Green, of Punduluoya, Ceylon, entitled "Further notes on *Dyscritina*, Westwood," was read, and illustrated by specimens and drawings. The author had discovered two distinct species of *Dyscritina*, which he was able to keep in captivity, and rear from the early larval stage to that of the imago. The characteristic abdominal cerci increased in length with successive moults, until in *D. longisetosa* they became much larger than the body. In the penultimate stadium they were lost without a moult, being probably bitten off by the possessor, the long basal joints alone remaining. The imago was a typical earwig, the forceps being developed within the basal joints of the cerci. Sensory organs on the antennæ and palpi were described, as well as the habits of both species. In the ensuing discussion Mr. M. Burr referred the imagos to the genus *Diplatys*, that of Mr. Green's new form being, he believed, a known species. The genus *Dyscritina* must therefore be sunk. Mr. Gahan observed that the fact of the forceps being developed within the basal joints of the cerci alone did not prove that they were not homologous with the entire cerci; perhaps the internal structure of the latter was retracted by a histolytic process before amputation. In *Forficula* he had found evident traces of meristic division in the forceps of embryos which were nearly on the point of hatching. Dr. Chapman read a paper entitled "Some remarks on *Heterogyna penella*," giving a full account of its life-history. The female was destitute of all appendages whatever, and only left the pupal case for pairing, returning within it ten minutes later. It possessed an organic connection with the pupal case in the situation of the legs. The larvæ were hatched within the case, and devoured the remains of the mother. On anatomical characters he assigned to the insect a place near the Zygænidæ. —W. F. H. Blandford, *Hon. Sec.*

South London Entomological and Natural History Society.—*February* 24*th*, 1898.—Mr. J. W. Tutt, F.E.S., President, in the chair. Mr. Kaye, Worcester Park, Surrey, and Mr. Chatterton, F.E.S., 7, Clissold Road, Stoke Newington, were elected members. Mr. S. Stevens exhibited several fine varieties of Lasiocampid moths, including bright yellow-brown *B. trifolii*, *B. quercus* with semitransparent hind wings, a dark well-banded *B. rubi*, and a remarkably light *L. quercifolia*. Mr. J. A. Clarke, a series of the Lasiocampidæ, including many fine and extreme forms of variation. Mr. R. Adkin, fine series and varieties of many of the same family. Mr. Tutt, an inbred series of *Zygæna filipendulæ*, showing the gradual coalescence of the spots and the usual order of this joining; a *Brephos parthenias* from Leicester, having yellow hind wings; and a yellow variety of *Arctia fuliginosa*. Mr. F. Clarke, photomicrographs of the curious scales of the aberrant Lepidopteron *Pseudopontia paradoxa*. Mr. Tutt read a paper entitled "The Lasiocampid Moths," illustrating it with specimens, diagrams, and the blackboard. A discussion ensued, Dr. Chapman, Messrs. J. A. Clarke, R. Adkin, S. Stevens, Hillsworth, McArthur, and Tutt taking part.

March 10*th*.—Mr. J. W. Tutt, F.E.S., President, in the chair. Mr. Donisthorpe, F.E.S., 73, W. Cornwall Road; Mr. F. Bouskell, F.E.S., Leicester; Mr. F. Lemann, F.E.S., Plymouth; Mr. Parkin, Battersea; and Mr. Bevins, Clapham Common, were elected members.

The evening was devoted to the exhibition of a large number of admirable photomicrographs made by Mr. Fred Clarke; together with a number of slides showing details of the *Odonata* (dragonflies) made by Mr. Lucas. The slides were of particular interest, as the objects were chosen in many cases by other members and handed to Mr. Clarke, who photographed and most skilfully manipulated them for exhibition in the Society's lantern.—Hy. J. Turner (*Hon. Rep. Sec.*).

Birmingham Entomological Society. — *February* 21*st*, 1898. — Mr. G. T. Bethune-Baker, President, in the chair. Mr. R. C. Bradley showed *Capua flavillaceana*, which had been common in Sutton Park last year, though in previous years he had only seen occasional specimens. Mr. P. W. Abbott, a very fine and well marked series of Cornish *Lycæna arion*; also *Gnophos obscuraria* from Lewis, with var. *calceolaria* and an intermediate form. Mr. Bethune-Baker, two drawers full of the genus *Colias.*—Colbran J. Wainwright, *Hon. Sec.*

OBITUARY.

John N. Young died somewhat suddenly on Feb. 13th last, at his residence in Rotherham. He was born in Lincolnshire, and as a young man spent several years in London. Between thirty and forty years ago Messrs. Guest and Chrimes acquired a branch of trade with which the late Mr. Farindon Lane was associated, and when he removed from London to Rotherham, Mr. Young, who was then one of his workmen, went with him, and thenceforth continued with the firm until disabled by his last illness, which was of a lingering character. Mr. Young delighted to spend his leisure hours in the woods and fields, and his wide knowledge of natural history was acquired by patient observation and practical acquaintance with the objects themselves. As an instance of the enthusiastic way in which he carried on his entomological work, it may be mentioned that he frequently walked some ten miles or more to a favourite wood or other collecting ground, where he would spend the night and then tramp home again the next morning. He was elected a member of the South London Entomological and Natural History Society in 1888, and he had an extensive circle of entomological friends, by all of whom he was esteemed as a warm-hearted and liberal correspondent.

John William Shipp died at 117, Cowley Road, Oxford, on Feb. 15th last, aged twenty-four years. From his boyhood Mr. Shipp was greatly interested in the study of natural history, and left the teaching profession to become assistant to the late Prof. Westwood, who held a high opinion of him as an entomologist. After the death of Prof. Westwood he had charge of the Zoological Department of the Oxford University Museum until the appointment of Prof. Poulton. Subsequently he was engaged on entomological work in the Hon. Walter Rothschild's museum at Tring. As a practical entomologist he was both expert and assiduous, and his published papers on Coleoptera, &c. (Entom. vols. xxvi.–xxx.) afford evidence of his ability in literary research, and also show that he was admirably qualified to deal with his subjects scientifically. His early death is much to be deplored.

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NOTES ON AQUATIC RHYNCHOTA.—No. 2.

By G. W. Kirkaldy.

1. *Brachymetra bakeri*, Kirk., n. sp.

Apterous form.—First antennal segment *four* times as long as the second. Second rostral segment extending *beyond* the apex of the mesosternum; third segment very short. Anterior femora *cylindrical*, incrassate, shorter than the whole length of the insect (from head to apex of abdomen), one-fourteenth longer than the tibiæ, which are five-sixths longer than the tarsi, first tarsal segment one-fourth longer than the second. Intermediate and posterior femora subequal; intermediate femora two-thirds longer than the tibiæ, which are about *five* times as long as the tarsi. Abdominal segments simple. Long. 13 mm. ♀. Colombia (*C. F. Baker*); my collection.

Head, first antennal segment, first and second rostral segments, pronotum, anterior femora, intermediate and posterior legs rufo-castaneous; anterior tibiæ and tarsi nigro-castaneous. Second antennal segment, metanotum and dorsum of abdomen blackish; third and apex of second rostral segments pitch-black (all these parts are more or less covered with short, rather coarse hair). Prosternum pale castaneous; mesonotum, mesosternum, and venter of abdomen with short, dense pubescence, silvery-white on the mesonotum, lilac-grey on the mesosternum, and slightly redder in tint on the venter of abdomen.

I am indebted to Prof. Carl F. Baker for sending me this species, and permitting me to retain the unique specimen for my own collection. It may be readily separated from *B. albinervus* (Am. Serv.) by the following characters:—

Length 6–7½ mm., first antennal segment twice as long as second; anterior femora incrassate, compressed, laterally dilated, one-sixth longer than tibiæ, which are two and a quarter times as long as tarsi; ventral surface covered with pale yellowish pubescence. (Brazil, Grenada, St. Vincent, &c.) - - - 1. *albinervus* (Am. Serv.).

Length 13 mm., first antennal segment four times as long as second; anterior femora incrassate, cylindrical, one-fourteenth longer than tibiæ, which are five-sixths longer than tarsi; ventral surface covered with lilac-grey pubescence. (Colombia.) - 2. *bakeri*, Kirk.

The introduction of this new species necessitates some modification of Mayr's generic diagnosis (Verh. Ges. Wien, 1865, p. 445; and Novara Exped., Hem., p. 178). The description of the antennæ and the mention of the length-equality of the anterior tarsal segments must be removed to the specific diagnosis of *B. albinervus*.

It is difficult to state a generic diagnosis that will succinctly distinguish *Brachymetra* from the other Halobatinæ. Bianchi gives the following characters (Ann. Mus. Zool. Petersb. 1896, p. 71):—First antennal segment shorter than the other three together, fourth not longer than third; anterior tarsal segments subequal; intermediate and posterior tibiæ and tarsi not ciliate. The last character eliminates *Halobates*, Eschsch.

Unfortunately the third and fourth segments of the only remaining antenna are missing in *B. bakeri;* but, as the first segment is *four* times as long as the second, I doubt very much the stability of Bianchi's first character (shown in Mayr's excellent figure of *B. albinervus*). The anterior tarsal segments in *B. bakeri* are, as shown above, distinctly unequal.

The other Halobatine genera differ as follows:—*Hermatobates*, Carp., is at once distinguished by the greatly incrassate and laterally-dilated anterior femora, and by the trisegmentate tarsi; in *Metrobates*, Uhl., and *Platygerris*, F. B. White, the first segment of the anterior tarsi is very much shorter than the second; while in *Potamometra*, Bianchi, *Trepobates*, Uhl., and *Chimarrhometra*, Bianchi, it is much longer; moreover the anterior femora of *Trepobates* are not incrassate.

The nearest ally, *Metrocoris*, Mayr, has the anterior margin of the pronotum strongly excavated, the basal process of the pronotum triangularly produced (not rounded), and the first segment of the anterior tarsi much shorter than the second.

Having regard to the specific variation in the proportions of the antennæ in the extensive genus *Gerris*, Fabr., it would seem well not to base other genera of the Hydrometridæ principally upon such proportions.

The length of the abdomen in *Brachymetra* (in both species the length of the head and pronotum combined is subequal to that of the abdomen) gives this genus a general aspect very different from most of the other genera of the Halobatinæ, approaching in this respect the Gerrinæ.

2. Gerris, Fabr.

In the third volume of Lethierry and Severin's Catalogue, *Gerris* is used as if it were feminine. It is presumably derived from the Latin masculine word "gerres" (a small kind of pickled fish of inferior quality). Fabricius, the author of the genus, employed it as a masculine word; but, without exception (I think), modern writers have treated it as feminine. These remarks apply also to its hybrid derivation *Platygerris*, F. B. White, with its single species *P. depressus*.

3. *Æpophilus bonnairei*, Sign.

In his charming 'Natural History of Aquatic Insects,' Prof. Miall writes (p. 380) that the adult *Æpophilus* is "found only in the month of October." Assured that this was a mistake, I wrote to Mr. Keys, who replied: "I have taken the mature *Æpophilus* in February, March, April, May, June, July, and August. I dare say it occurs therefore all the year round . . . I have taken the greatest number at a time in May." Has anyone taken macropterous examples?

4. I have made an unfortunate mistake with regard to Say's New Harmony paper, stating that no copy apparently existed (*ante*, p. 2). My friend Prof. Uhler writes me that two copies of this exceedingly scarce paper exist: one (that from which Dr. Fitch reprinted in 1858) is now in the Library of the Boston Society of Natural History; the other is in Prof. Uhler's Library. The exact title of this thirty-nine-page pamphlet is 'Descriptions of New Species of Heteropterous Hemiptera of North America. By Thomas Say. New Harmony, Indiana. December, 1831.' It would be interesting to know if any copies exist in Europe now.

MICRO-LEPIDOPTERA TAKEN AT BLOXWORTH, DORSET.

By Rev. O. Pickard-Cambridge, M.A., F.R.S.

This list was drawn up at the end of the season of 1896, put aside, overlooked, and then, in spite of every effort to find it, quite lost sight of until a few days since. If, however, it is thought worth inserting in the 'Entomologist' thus late in the day, it will show that the season of 1896 was not so barren a one here as I believe it proved, chiefly owing to drought, in many other localities.

As regards the sequence of species in the list, I may observe that no systematic arrangement is intended.

Sophronia parenthesella.—Fairly frequent at the middle of July on one spot on the heath.

Aciptilia paludum.—In its old locality very abundant on two evenings (Aug. 4th and 5th), on which I caught forty-seven specimens, but scarcely to be found afterwards; all were in the finest condition.

This interesting little "plume" seems to defy all attempts to discover its life-history.

Penthina ochroleucana.—A few on Scotch-rose bushes near my front door. I have taken it on these now for some years past, but never anywhere else.

Peronea rufana.—Very occasionally, amongst sallows in a swamp.

Nematois minimellus.—Not rare in open places in woods among scabious (*Scabiosa succisa*), but as they must be swept for, their condition is seldom very fine.

Cleodora cytisella.—Abundant among fern (common bracken), but, for the same reason as just given in respect to the last species, only one now and then in fine condition.

Elachista monticola.—Abundant in a swamp; one or two as early as June, but chiefly in August and early September.

Cosmopteryx orichalcella.—Very abundant on one heath-bog, by sweeping and brushing. As the result of two or three strokes I had once over forty in my net at the same moment; these, as they danced up the inside of the net, with the setting sun shining full upon them, formed one of the most brilliant sights, in a small way, that I have ever seen. Even with the greatest care and watchfulness I could never detect this lovely little moth on the wing, and only twice spotted it at rest on a rush-stem.

Laverna decorella.—Not infrequent on whitethorn.

L. lacteella.—Scarcer than I have yet seen it since it was first found here some years ago.

Œcophora lambdella.—Occasional among old and dead furze-bushes.

Pancalia lewenhoekella.—Occasional on one or two widely separated spots.

Cerostoma horridella.—Very rare; only two or three specimens.

C. lucella.—Scarce; the old bushes which used in former seasons rarely to fail, hardly afforded any.

Zelleria insignipella.—Two or three well-marked specimens of this form, which, I believe, is now considered to be only *Z. hepariella* var.

Eupœcilia geyeriana.—Evidently had been abundant, but I was too late for it in very good condition.

Phoxopteryx siculana.—Occasional.

P. biarcuana.—Frequent.

P. inornatana.—Abundant.

Cedestis farinatella.—Occasional on Scotch firs.

Pædisca bilunana.—Occasional on birch.

Chauliodus illigerellus.—Abundant in damp wood-paths, open and swampy places.

C. chærophyllellus.—Very scarce.

Œnectra pilleriana.—Rare.

Brachmia mouffetella.—Two specimens in orchard.

Bryotropha mundella.—For the first time, on Bloxworth Heath. This form is not rare at Portland, under sandy and rocky ledges along the Chesil beach.

Eupithecia linariata.—Two or three on wing, and several larvæ on yellow toadflax.

E. centaureata.—Occasional.

E. coronata.—Very scarce.

Carpocapsa splendana.—Bred from acorns, and also beaten out of underwood.

Nannodia næviferella (*stipella*).—Rather abundant by brushing along among herbage under hedges.

Gracilaria tringipennella.—Two specimens; this is a very scarce species in this district.

Gastropacha quercifolia.—One specimen, apparently only just out of the pupa, beat from a stunted thorn-bush on a bare down. This is only the second specimen taken here during many years.

Œcophora minutella.—One specimen on the window in my sitting-room.

Mixodia ratzburgiana.—Not infrequent on spruce firs about the middle of August, but mostly rather worn.

Elachista perplexella.—Several examples on a heath-bog, at the end of May and beginning of June.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 88.)

Cidaria silaceata, *Hb.*—Local and occasionally numerous, but with a wide distribution, though I have no southern records. Variation in three principal directions is observable, namely, the breadth of the median band; its being broken into two portions by the connection of the parallel pale bands by either one or two streaks across its area; and the white ground colour of the hind marginal area of the wing being richly tinted with yellow. I have not seen any examples of the first of Newman's figures, which has a pale portion in the centre of the median band. Abundant at Clonbrock, Co. Galway; also at Markree Castle, scarce at Rockwood, Co. Sligo; scarce near Enniskillen (*Partridge*) and Strabane (*C.*); abundant at Favour Royal, Co. Tyrone; and at Collin Glen, Belfast (*W.*); Farnham, Cavan; Killynon, not rare, Co. Westmeath.

Cidaria prunata, *L.*—I know very little of the range of this species. I have only met with it about gardens, never in woodlands, and have found it generally scarce. It would, therefore, appear that it is restricted to currant and gooseberry as food-plants. Kingstown, in some numbers; Derry, abundant (*C.*); Armagh (*J.*); Killynon, Co. Westmeath (*Miss R.*).

Cidaria testata, *L.*—Very common on the sides of mountains throughout Ireland. Irish specimens are, by some collectors, considered often to vary from the usual British type by having a more purple tint.

Cidaria populata, *L.*—Extremely common in ancient woodlands. Varies in strength of colour of the median band, as well as the brightness of the general ground colour, which sometimes is similar to *C. dotata.* I have not met with the var. *musauaria*, Frr., which is taken at Rannoch.

Cidaria fulvata, *Forst.*—Abundant where found, but apparently very local in Ireland. Kingstown; Ardrahan and Clonbrock, Co. Galway (*R. E. D.*); Killynon, Westmeath (*Miss R.*); Armagh (*J.*); Derry (*C.*); Favour Royal, Tyrone; Minehead, Co. Waterford.

Cidaria dotata, *L.*—More generally found on the coast than inland, and widely distributed; sometimes abundant. Powerscourt (*B.*) and Greystones, Co. Wicklow; Howth (*B.*) and Malahide, Co. Dublin; Rathangan and Athy, Co. Kildare; Minehead, Co. Waterford; Killynon (*Miss R.*); near Sligo, abundant; Inver, ditto, Co. Donegal; Magilligan, ditto, Co. Derry, very abundant; Ardrahan and Clonbrock, scarce, Co. Galway.

[Cidaria associata, *Bork.*—I am extremely doubtful if this insect occurs in Ireland. Birchall gives Cork, Kingstown, and Powerscourt. Mr. Campbell states that it is abundant at Magilligan; but I question if the synonymy has not led to an error, as the preceding species is very numerous there; but I have not seen a specimen of *associata* from the locality. It is wiser to omit this species till its occurrence is definitely established.]

Pelurga comitata, *L.*—Like *C. dotata* this is a coast-loving species, though found also inland. This is probably owing to the perennial abundance of its food-plant on the beaches, undisturbed by the plough. It is very widely spread, and without being very common anywhere is frequently met with. Howth, common (*B.*), coast of Wicklow; Minehead and Dromana, Co. Waterford; at many places on the coast of Cork; Dingle, Kerry; Sligo (*Russ*) and Markree Castle; Coolmore and Stranorlar, Co. Donegal; Dalyston near Loughrea and Clonbrock, Co. Galway; Killynon, Co. Westmeath; Tempo Manor, abundant (*Langham*); Belleisle, Co. Fermanagh; also Co. Tyrone and Cavan, &c.

Eubolia cervinata, *Schiff.*—Numerous at Howth and Sutton, Co. Dublin; Greystones, Co. Wicklow; Castle Bellingham (*Thornhill*); Rossbeigh, abundant, Co. Kerry; Mallow, Co. Cork (*Stawell*); Sligo.

Eubolia limitata, *Scop.*—A very common Geometer everywhere. Varies considerably in the depth of colour.

Eubolia plumbaria, *Fb.*—Very common. It varies considerably, the ground being sometimes a warm grey, but occasionally whitish grey; also the lines bounding the median band are sometimes slight and ferruginous, and sometimes a dark brown and suffused over the band.

MESOTYPE VIRGATA, *Rott.*—At a considerable elevation on Mangerton Mount near Killarney (*B.*); and at Newcastle, Co. Down (*Bw.*).

CARSIA PALUDATA, *Thnb.*—Var. *imbutata*, Hb. Birchall gives Howth as a locality on the authority of Mr. Shield; but the food-plant is not at present found there, nor a suitable marshy habitat; and I should doubt the statement. The moth, however, exists on the bogs bordering the Shannon near Banagher, and thence to Ballinasloe; but it is difficult to meet with, being scarce. Some twelve miles further west, at Clonbrock, the Hon. R. E. Dillon has taken two. The food-plant is, however, fairly abundant in extensive bogs in that neighbourhood, not yet examined at the proper season. At Killynon, Westmeath, Miss Reynell has taken two specimens. Doubtless the species exists in many of the Irish bogs. My series is more handsomely marked than the usual Lancashire specimens, and far richer in colour than two I have from Scandinavia, labelled by Sven Lampa var. *sororiata* and var. *obscurata* respectively. The former seems to be the form described by Staudinger as "forma dilutior, cinerascens, magis unicolor." It is of a dingy grey, marked with rather washed-out fuscous bands, and has no reddish tint. The latter, *obscurata*, is a darker brownish grey insect, with costal traces of the bands, the outer one more continuously indicated by a pale sinuous line, and near the apex there is a flush of ferruginous. Neither specimen would be easily identified by anyone accustomed to our strongly-marked form, which belongs to the var. *imbutata*.

ANAITIS PLAGIATA, *L.*—Widely spread, and locally abundant. The two dark bands which traverse the centre of the wing sometimes coalesce about mid-wing. They are also variable in depth of marking, sometimes being very dark. The burnt sienna flush near the apex of some specimens is very rich, while in others it fails entirely.

CHESIAS SPARTIATA, *Fues.*—Apparently has been overlooked by collectors. Near Derry, abundant (*C.*); on the slopes of Slieve Beagh Mt., Co. Monaghan. I have also beaten the larvæ elsewhere, but have forgotten the localities.

TANAGRA ATRATA, *L.*—Local, but there plentiful. Widely distributed. Kylemore (*Hon. E. L.*), Clonbrock, Glendalough (*Miss R.*), Ardrahan, &c., Co. Galway; Markree Castle, Co. Sligo; Belleek (*J.*) and Tempo (*Langham*), Co. Fermanagh; Cromlyn (*Mrs. B.*), Co. Westmeath; Stranolar, Co. Donegal; Ennis, Co. Clare; Tramore, Co. Waterford; &c.

(To be continued.)

NOTES ON LEPIDOPTERA FROM THE MEDITERRANEAN.

By Fleet-Paymaster GERVASE F. MATHEW, R.N., F.L.S., F.Z.S., &c.

(Concluded from p. 84.)

We left Malta on April 1st, arrived at Ville Franche, near Nice, on the 4th, and remained there until the 28th, as guardship to the Queen during her visit to Cimiez. The town is situated on the slopes of steep hills at the head of a lovely bay, and above it are numerous pretty villas nestling among a profusion of olive, orange, poplar, carob, and other trees, and most of them are surrounded by delightful gardens. Above these there are patches of open ground covered with rough boulders, amongst which a variety of aromatic shrubs were growing and flowering in the wildest luxuriance, and beyond this, again, up to their summits, the hills were clothed with sweet-smelling pines. Everyone knows or has read of the beautiful Riviera, so I will not take up your space with an attempt to describe the lovely scenery. I must, however, just say that from one of the highest points above Ville Franche—Mont Vinaigrier—one can obtain a most magnificent view of Nice and the surrounding country. My collecting expeditions were chiefly confined to this open ground between the highest villas and the belt of pine wood, and to some open spots among the villas between Ville Franche and Beaulieu. I also made one or two excursions farther away to the slopes near the upper Corniche road.

On April 5th I met with *P. rapæ*, *P. brassicæ*, *C. edusa*, and *C. pamphilus* in abundance, and took or saw several examples of *P. podalirius* (worn), *G. c-album*, *P. daplidice*, *P. atalanta*, *P. cardui*, *G. cleopatra*, *L. megæra*, *L. argiolus*, *L. baton* var. *panoptes*. *Pyrausta punicealis* was common among wild thyme, and *Rhodaria sanguinalis* abundant among sun-cistus and wild sage. On the 10th I went with a picnic party to visit Eze, a very ancient village perched on the summit of a lofty rock at the head of a deep gorge. It is some 1600 feet above the sea-level, and commands a splendid view. From Eze station the path, not much better than a donkey-track, winds in a zigzag fashion up the ravine, and was steep and difficult in some places. The sides of the gorge were clothed with olive and pine trees, and when we got higher up we met with ash, poplar, ilex, mountain-ash, willow, &c. Bushes of some kind of *Genista* were thickly covered with their pretty yellow flowers, and various kinds of *Euphorbia*, some large and bushy, were also clothed in their greenish-yellow bloom. Upon one of these I was surprised to see a fine specimen of *Panolis piniperda* enjoying itself, and a little farther on I took *Agrotis puta*. No fresh butterflies were seen that day, except one small *Argynnis*, which was probably *euphrosyne*. It took us some little time getting up to the village, and several halts were made on the way for the purpose of admiring the scenery; but when at last we reached the top we were amply repaid for our climb. At one period the village was evidently well fortified, probably when it was inhabited, some centuries ago, by the Knights of Malta. Above the village, upon the highest point of rock, stand the ruins of a castle, and the view from here is simply superb. We had our picnic in a little meadow off the track, about a quarter of a mile below the village. It was a most romantic spot, and the long climb and invigorating air had given us all keen appetites.

On the 12th I noticed the first *P. machaon*, and by the 17th they were out commonly, and were joined by *Anthocharis cardamines*, *A. euphenoides*, *P. mæra*, *L. icarus*, and *C. phlœas*, and on this day I took the only specimen of *Thecla rubi* seen during our stay at Ville Franche. *Cidaria* sp.?, *Camptogramma bilineata*, *Minoa euphorbiata*, and *Mecyna polygonalis* (1) were taken by beating. On 19th *P. egeria* and *Spilothyrus alceæ* were added to the list, but nothing fresh was noticed after this date. Nests of the larvæ of *Cnethocampa* were plentiful on the pines. If we had remained here for another month a great many more species would doubtless have been taken, and I should say from the appearance of the country that Lepidoptera would be abundant during May and June.

We arrived at Suda Bay, Crete, on May 2nd, and remained on the coast of that island, principally at Canea, until July 6th. All the time we were there the country was in such a disturbed condition that our admiral gave orders that no officers were to go alone outside the town, but were to be in parties of not less than two or three together, to be in uniform, and armed with revolvers, and on no account were they to pass the cordon of international troops, which extended from two to three miles beyond the town. This made collecting rather a trying matter, for it is no easy thing to run after a butterfly in a blazing hot sun, with a revolver-belt round one's wrist, and with a closely-fitting tunic buttoned up to one's throat, not to mention the absence of voluminous pockets for the stowage of glass-bottomed boxes, &c.

Canea, which is one of the largest towns in Crete, is situated at the corner of a wide bay facing the north. It is irregularly built, and the streets are narrow, dirty, and badly paved. It is enclosed by old walls and fortifications, with a bastion and ditch on the land side, the work of the Venetians. Beyond the town there is an extensive plain, which stretches away to the foot of the lower slopes of the range of lofty mountains which run from east to west throughout the island. It is very fertile, and contains vineyards and olive-gardens, and a large quantity of corn, maize, melons, garden produce, &c., is usually cultivated. Owing, however, to the unhappy state of the country, many of the fields were lying fallow, vineyards were neglected, olive-trees had been cut down, and farm-houses burnt by the insurgents or the Mahommedans.

On May 12th we left Canea and proceeded to Platania, a small village about six miles to the westward, to assist at and superintend the embarkation of the Greek troops who were leaving the island. We remained there until the 27th. About a mile and a half off Platania there is a small rocky island called Theodore Island. It is about half a mile long by a quarter broad, is hilly, very rough, the ground being covered with blocks of volcanic tufa, between which there was an abundance of vegetation, consisting of two kinds of stunted and very prickly bushes, the names of which I do not know, wild sage, thyme, peppermint, bramble, many bulbous plants, various grasses, &c. I landed on it several times and found the pretty little *Cœnonympha thyrsis*, which is peculiar to Crete, in the greatest abundance, indeed they were so plentiful on flowers of peppermint that I frequently had six or seven in my net together. Besides these I noticed *P. machaon*, *P. daplidice*, *P. megæra*, *Satyrus semele*, *S. alceæ*, *M. stellatarum*, and several *Acontia solaris*. A pretty *Phycis* was also extremely numerous.

During June, in the neighbourhood of Canea and Suda Bay, I took the following:—

Papilio machaon.—Common; larvæ on fennel.

Papilio podalirius.—Common; larvæ on fennel.

Pieris rapæ.—Black blotch at tip of fore wings large and distinct; scarcely any black at base of wings; under side of hind wings very pale greenish white, almost white in fact.

Pieris brassicæ.—Only one seen.

Leucophasia sinapis var. *diniensis.*—Three examples.

Colias edusa.—Common.

Polyommatus phlæas.—A few, rather large and dark.

Lycæna astrarche.—Common and typical, but small.

Lycæna icarus.—Abundant. A remarkably small race; some of the females, which are dark brown without any blue, are only five-eighths of an inch across the wings, and the males have the spots and markings beneath very small and obscure. The comparison between this race and the form taken a month later at Malta is very great.

Lycæna argiolus.—Common, flying over bramble-blossom. Females fine, and strongly marked.

Vanessa egea.—Not uncommon. Generally found near habitations, and fond of alighting on walls.

Pyrameis atalanta.—A few, but rather a stunted race.

Vanessa cardui.—Abundant.

Satyrus semele var. *aristæus.*—First seen on June 12th; rather uncommon, and difficult to catch. Females very fine and large, expanding 2½ inches across the wings.

Pararge megæra.—Abundant.

Pararge egeria.—Abundant.

Epinephele lycaon.—Common. First observed June 10th. Found on waste uncultivated places. They do not fly much, and are fond of settling under banks, or on the shady sides of boulders or walls. The males with their wings closed are very like *E. ianira*. The females are not so numerous as the males.

E. ianira var. *hispulla.*—Abundant. Haunt shady lanes, where I have beat them from bramble and other bushes. The females were more common than the males, were fine large examples, and some of them varied a good deal beneath.

Cœnonympha thyrsis.—Common in waste places among wild thyme, &c., but nothing like so abundant as it was on Theodore Island.

Spilothyrus alceæ.—Common.

Syrichthus malvæ.—One specimen.

Hesperia actæon.—Abundant.

Hesperia nostrodamus.—One or two.

Deilephila euphorbiæ.—Several observed at night, flying in front of our electric lights.

Macroglossa stellatarum.—Common.

Callimorpha hera.—One at rest.

Catocala sp. ?—One at rest.

Camptogramma bilineata, *Acidalia ornata*, *Sterrha sacraria*, *Anaitis* sp. ?, and several undetermined species of Geometræ, were beaten from hedges; *Scopula ferrugalis*, *Crambus chrysonuchellus*, and another species of *Crambus*, were common among rushes.

This is rather a poor list, and I was disappointed at not getting more. No doubt, had I been able to go for any distance inland, or up the mountains, I should have obtained a number of interesting species, for, as far as one could see, the country looked most promising.

We left Crete on July 6th, and arrived at Malta on the 8th, and remained there until Aug. 2nd, when we sailed with the fleet for a delightful cruise up the Adriatic. Our first place of call was Corfu, where we arrived on the 4th. This is a charming island, and looks a perfect place for collecting in. There are so many lovely walks, all among gardens and vineyards and olive-groves, and the country is so diversified—mountains and plains, open slopes, wooded gorges, and marshy places. I should much like to visit it during May and June. We remained until the 12th, and stopped again on our way back from Sept. 21st until the 28th. I will give a list of the Lepidoptera I met with, omitting such common species as *P. rapæ*, *P. brassicæ*, *Pyrameis cardui*, &c., and will not mention these for the future in any other list, except there is anything peculiar about them which may call for a remark.

Papilio podalirius and *P. machaon.*—Both common.

Pieris daplidice.—Both common.

Leucophasia sinapis var. *diniensis.*—The most abundant species, met with by roadsides, in olive-gardens, &c. These, of course, were a second or third brood. This is a favourite of mine, and I like to watch its gentle airy flight, as it flutters to and fro amongst the thickest undergrowth where, strange to say, it seldom injures its delicate wings.

Colias edusa var. *helice.*—Two specimens.

Rhodocera cleopatra.—One male.

Polyommatus phlœas var. *eleus.*—A few.

Lycæna telicanus.—Several.

Lycæna argiolus.—Common about bramble. Females were depositing their eggs upon terminal shoots and small unripe fruit.

Limenitis camilla.—One fine male. This, of course, must have been a second brood.

Vanessa egea.—Common, but the specimens were small.

Melitæa didyma.—Common, and the females vary a good deal, and some of the varieties are very interesting. A second or third brood.

Argynnis paphia.—Several seen, and one taken on August 11th, late in the afternoon, when they were retiring for the night among ivy-leaves growing on trees in a gloomy little covert in the King's Park.

Satyrus hermione.—Common, but difficult to catch. They are fond of sitting upon the trunks of olive-trees, and an old tree with a hollow trunk is a favourite place. As one passes they dash out, but do not fly far, generally pitching again on the next tree; but they are very wary, and have to be approached with great caution. There were more females than males.

Satyrus semele var. *aristæus.*—This species puzzled me a good deal at first. *Semele*, as we know it in England, delights in the sun, occurs in heathy localities, and upon downs near the sea, and when disturbed usually settles upon a stone, or upon a bare patch of ground. These were found sitting upon the trunks of trees in shady places, generally high up, were very wary, and flew off at the least noise, and then settled upon the under side of a branch higher up and quite out of reach. It was some time before I succeeded in capturing one, and then I could not quite make out what I had got. Two or three that I disturbed flew into some thick covert, and upon following them I discovered a good many sitting upon ivy-covered trees, upon the trunks, under the branches, and upon the leaves. It was very dark and gloomy, and not a place where one would expect to find such a sun-loving species as *semele.* Nevertheless it seemed to be their head-quarters, and I soon caught fourteen or fifteen of them, and might have taken more had I wished to do so. They were nearly all females, and large examples, very dark, and in fine condition, the females averaging 2½ inches across the wings.

Pararge roxelana.—A few, but in poor condition. Habits similar to those of *S. hermione.*

Pararge egeria and *egerides.*—Common in the King's Park.

Epinephele ianira var. *hispulla.*—Common, but rather darker than specimens from Crete or Malta. Was still on the wing on Sept. 27th.

Epinephele ida.—A few, but mostly worn.

Cœnonympha pamphilus var.—A very interesting dark form. This may be a distinct species.

Spilothyrus alceæ.—Common.

Syrichthus proto.—Six examples only, on Vido, a small island lying between Corfu and the mainland.

Hesperia nostrodamus.—One or two, also taken on Vido.

No doubt many more butterflies would be obtained during May and June, and an excursion to the mountain chain of San Salvador, the highest point of which is 3000 feet above the sea, would produce some interesting species, but I was not able to undertake this.

From Corfu we went to Valona Bay, on the coast of Albania, where we remained for a couple of days, but I was unwell and unable to land, for which I was sorry, as it was a wild-looking place, and I should most likely have obtained some fresh species there. We then went across the Adriatic to Brindisi, where we arrived on Aug. 16th. The country in the neighbourhood of the town is uninteresting from an entomological point of view, the principal road taking you out in a straight line for miles between never-ending vineyards. It was very hot while we were there, and the roads were two inches deep in white glaring dust. I never saw such dust in all my life. On each side of the mouth of the harbour there are extensive tracts of marshy ground, dry at the time of our visit, but more or less flooded, I was told, during the winter months, and here *Satyrus statilinus* var. *allionia* was very abundant, and in fine condition, some of the females measuring 2¾ inches.

The inner harbour forms into two portions, one arm extending to the right, and the other to the left, as you approach the main landing-place. At the head of the right arm, beyond the Ponte Grande, there is rather an extensive valley, through the centre of which, during the winter months, runs a small stream, but the day I visited it it was quite dry. Most of this valley was under cultivation—garden produce, maize, &c.—but there were some rough places here and there, where numerous wild flowers, especially fleabane and aster, were growing in masses. Common butterflies were plentiful, and among others I took some fine fresh examples of *Melitæa didyma*, including one or two nice varieties. *L. bætica* was common in a field of French beans, *P. podalirius* and *P. machaon* occasionally settled on flowers of wild aster, *E. ida* was plentiful among fleabane, but worn, several each of *S. alceæ*, *S. malvæ*, and *H. nostrodamus* were taken off wild thyme, and *E. grammica* was kicked up from rushes.

We left Brindisi on August 21st, and anchored off Ancona the next day. The city is picturesquely situated on the slopes of a hill between the two promontories of Monte Ciriaco and Monte Mariano. There are some nice country walks beyond the town, and good collecting-ground on the slopes facing the sea to the northward. In the latter locality *Lycæna telicanus* was tolerably plentiful on flowers of fleabane, and a *Zygæna*, *angelicæ* I think, was booming about in some numbers. This, of course, was a second brood. *Pyrausta aurata*, *Scopula ferrugalis*, and *Acidalia rubiginata* were beaten from wild peppermint.

We arrived at Venice on Aug. 27th, but there was no collecting

ing to be done then, for every spare moment of our short stay was occupied in seeing as much as I could possibly do of this most beautiful city. However, one morning, in the People's Park, I noticed *P. machaon*, *L. telicanus*, *L. icarus*, *L. argiolus*, *H. linea*, and the *Zygæna* taken at Ancona.

We left Venice on the morning of September 3rd, anchored off Trieste the same afternoon, and remained there until the 15th. During our stay we had frequent thunderstorms, with very heavy rain, but the most severe one was between nine and ten o'clock on Sunday, the 12th, when the sky was one blazing mass of lightning, and the roar of the thunder incessant, and it was accompanied by a terrific downpour of hail and jagged pieces of ice, some of the stones being as large as pigeon's eggs. This occasioned an immense amount of damage to the olive-trees. I was on shore the next day and noticed the ground beneath the trees thick with the fruit that had been knocked off.

Trieste is a beautiful city standing upon the shore of an extensive bay, and running up the slopes of several hills behind, which are backed by higher hills, in some places under cultivation, but elsewhere clothed with woods of pine, oak, and chestnut. There are many delightful wooded slopes and valleys within easy reach, which in the proper season must be alive with insects. To one of these places, about four miles from the town, I made two excursions. The hill-side was about half-way between Trieste and Miramar, and I found the ground overgrown with scrub-oak, Spanish chestnut, heath, juniper, broom, &c. The heath was in bloom, and there were many attractive flowering plants besides. Butterflies were flying about in great numbers, the most abundant species being the brilliant *Lycæna bellargus*, which was very fine and fresh. *L. telicanus* and *L. astrarche* were common, and I netted one fresh female *L. argiades*. *Satyrus briseis* were numerous, but much worn; *S. semele* typical, and still in fine condition; *S. statilinus* and *S. hermione*, several of each, but not worth taking; *P. machaon*, one fresh example; *C. edusa* and *C. hyale* plentiful, and the latter very fine; *L. sinapis*, several; *Argynnis dia*, three or four in fine condition but small; *A. paphia* or *A. pandora* seen; *M. didyma*, a few; *H. linea*, one, and *Syrichthus* sp?, two examples which I have not yet been able to identify.

Another good locality near Trieste is the Boschetto, a wooded hill at the end of the Via dell Aquedotto, which is laid out in numerous paths, and is much frequented, late in the afternoon, by loving couples from the town. Here, one day, I took, in addition to most of the species already mentioned, *Satyrus actæa*, *P. egeria* var. *egerides*, *H. sylvanus*, and *Spilosoma fuliginosa*, the latter, I should think, must have been one of a third brood.

On Sept. 9th, while walking from Trieste to the Castle of Miramar, I saw a large fresh-looking female *Limenitis camilla*, flying about some honeysuckle, but not having a net with me I was unable to catch it. Surely this was very late?

We left Trieste on Sept. 15th, and arrived at Pirano the same day. Pirano is only some ten miles from Trieste, and is situated just inside Madonna Point, at the south-west corner of the Gulf of Trieste. It is an old-fashioned little town, with an old wall and towers which used to protect it on the land side, and an old fortress. There are many delightful walks among gardens and vineyards, and above them on the hill-sides there is a certain amount of uncultivated ground, where I met with most of the species I observed at Trieste, *P. mæra*, of which I saw three or four, being the only addition. *C. hyale* was more plentiful here, and I saw another *L. argiades*.

On the afternoon of Sept. 17th, while passing a fence by the side of a small patch of Indian corn, I noticed a brown-looking object near the ground, upon one of the palings, partially hidden among some sprays of common bindweed which was climbing up the fence, and upon stooping down discovered that it was a large full-grown larva of *Sphinx convolvuli*. It was almost the exact colour of the piece of rail upon which it rested. There was a quantity of bindweed growing among and up the stalks of the Indian corn, and I had a long hunt in the hope of finding more, but did not do so. The next day I was passing the same place, and stopped to gather some food, when I was pleased to find a small larva about a week old. It was 1¾ inches long, of a pale glaucous-green colour, thickly irrorated with raised white dots, with seven oblique white stripes, bordered above by a darker shade of green on the sides. Spiracles orange; legs pink; horn nearly straight, slender, yellowish green, tip black. On Sept. 26th, while we were at Corfu, I landed on Vido Island to procure some food for the above larva, which by this time was nearly full-grown; and when I came on board I placed the bindweed upon a piece of newspaper, and when I removed it to put it into a bottle of water, I found two tiny little larvæ, which I must have picked with the food, crawling over the paper, and two days after I noticed that there were three small larvæ with the large one, so that there must have been an egg or another larva on the food. They appeared to be common on Vido, for on two other occasions when I went for food I picked either eggs or small larvæ, as I had eight altogether when we left. The larvæ fed up very rapidly, for the last just hatched, found on Sept. 27th, had buried by October 18th. The larvæ do not assume their brown coats until after their last change of skin; at least none of mine did.

It is rather difficult to rear larvæ on board ship. When they are small, and I know that they are not likely to bury or spin up, I place the food with a piece of stick in an ordinary wine-bottle, and then sleeve it, tying one end of the sleeve round the neck of the bottle, and the upper part round the top of the stick. When they are full grown they are transferred to a biscuit-tin, with a square hole cut in the lid, over which I paste a piece of muslin; the tin is then half-filled with earth, and then it is ready for the larvæ to bury when they feel disposed, and of course they are supplied with fresh food until they do so. This plan answers pretty well. Unfortunately one of my tins in which four of the *convolvuli* larvæ had buried was jerked off a shelf by the concussion of one of our big guns, and I found earth and larvæ just about to change had fallen into my washing-basin, and there was an awful mess, and the shock to the larvæ caused them to produce malformed pupæ, which I had to throw away. The other four are now (Feb. 15th) well and healthy, and I am rather curious to know when the moths will emerge.

We left Pirano on Sept. 19th, reached Corfu on 21st, and sailed from thence on the 28th, arriving at Malta on 30th. Here we stopped until Nov. 5th, when we went to Marmarice, on the coast of Syria, where we arrived on 9th. It was then bitterly cold, and all the hills were covered with snow. Marmorice is a beautiful land-locked harbour, surrounded by irregular masses of lofty hills, mostly thickly wooded, especially the slopes facing the gullies. I should like to visit it in May and June, for it has the appearance of a likely looking hunting-ground. Next day I landed with a shooting party; there had been a sharp frost the previous night, and many of the pools were coated with ice. I found a full-grown larva of *A. atropos*, and also a small one only a few days old; this was bright green, with pale greenish-yellow stripes, and a long slender and almost straight horn. The former is now a healthy pupa; the latter I left, and am doubtful if it ever reached full growth, for the cold must have killed it. This was about my last capture in 1897.

H.M.S. 'Hawke,' Alexandria: Feb. 15th, 1898.

TORTRICES OCCURRING IN THE VICINITY OF THE CHESHAM LINE.

(Continued from p. 94.)

Sideria achatana, Fabr.; Wilk.; Staint. (*Cydia achatana*, Mey.).—Not uncommon at Mill Hill and Neasden. May be obtained by beating hawthorn hedges.

Sericoris bifasciana, Haw.; Wilk.; Staint. (*Eucosma bifasciana*, Mey.). — Fairly common among Scotch firs in a small plantation near Midland station, Mill Hill. Larva feeds in the flowers of the pine.

Sericoris rivulana, Scop. (*S. conchana*, Wilk.; Staint.

Eucosma rivulana, Mey.).—Some years pretty common in meadows at Northwood and Mill Hill.

SERICORIS LACUNANA, Dup.; Wilk.; Staint. (*Eucosma lacunana*, Mey.).—Generally abundant.

EUCHROMIA PURPURANA, Haw.; Wilk.; Staint. (*Eucosma purpurana*, Mey.).—Once at Chalfont.

ORTHOTÆNIA ANTIQUANA, Hübn.; Wilk.; Staint. (*Eucosma antiquana*, Mey.).—One fine fresh example of this species was found on a shop window in St. John's Wood. It had probably been brought in from the country as a larva or a pupa.

ORTHOTÆNIA STRIANA, Schiff. (*Euchromia striana*, Wilk.; Staint. *Eucosma striana*, Mey.).—I have only met with this at Chalfont.

ORTHOTÆNIA BRANDERIANA, Linn. (*Euchromia branderiana*, Wilk.; Staint. *Eucosma branderiana*, Mey.).—Sometimes met with in the larval stage in folded leaves of grey poplar at Northwood, but I have only twice seen the moth there.

PHTHEOCHROA RUGOSANA, Hübn.; Wilk.; Staint. (*Commophila rugosana*, Mey.).—Once met with in a field at Kingsbury near the dam of the Welsh Harp Reservoir.

CNEPHASIA MUSCULANA, Hübn. (*Lozotænia musculana*, Wilk.; Staint. *Cacœcia musculana*, Mey.).—Generally distributed and common almost throughout the whole district, but most frequently met with in lanes bordering woods.

SCIAPHILA NUBILANA, Hübn. (*Cnephasia nubilana*, Wilk.; Staint. *Tortrix nubilana*, Mey.).—Common in most hedgerows.

SCIAPHILA VIRGAUREANA, Tr. (*Cnephasia virgaureana*, Wilk.; Staint. *Tortrix virgaureana*, Mey.).—A very abundant species, and as variable as it is common.

SCIAPHILA HYBRIDANA, Hübn. (*Cnephasia hybridana*, Wilk.; Staint. *Isotrias hybridana*, Mey.). — Widely distributed and often common in certain hedgerows.

SPHALEROPTERA ICTERICANA, Haw.; Wilk.; Staint. (*Tortrix longana*, Mey.).—In meadows at Northwood in July.

BACTRA LANCEOLANA, Hübn.; Wilk.; Staint.; Mey.—Common in most marshy places, but there is less variation among the specimens than is found in some localities south of London. The moth is on the wing throughout the summer.

PHOXOPTERYX LUNDANA, Fabr. (*Anchylopera lundana*, Wilk.; Staint. *Ancylis lundana*, Mey.).—Common in lanes at Chalfont. There are two broods, the first appearing in May and the second in August.

PHOXOPTERYX MITTERBACHERIANA, Schiff. (*Anchylopera mitterbacheriana*, Wilk.; Staint. *Ancylis mitterbacheriana*, Mey.).—I have only met with this species at Chalfont. May and June.

Grapholitha ramella, Linn. (*Hedya paykulliana*, Wilk.; Staint. *Cydia ramella*, Mey.).—Often abundant at Northwood among birches in the summer. There are two forms, and these occur in about equal proportions. July and August.

Grapholitha nisella, Clerck. (*Lithographia nisella*, Wilk.; Staint. *Epiblema nisella*, Mey.).—Occurs sparingly at Northwood, and most of the named forms are represented among the examples obtained there. July and August.

Grapholitha cinerana, Haw. (*Lithographia cinerana*, Wilk.; Staint.).—Abundant some years on grey poplar at Northwood. A very much less variable species than the preceding. July.

Grapholitha subocellana, Don. (*Lithographia campoliliana*, Wilk.; Staint. *Epiblema subocellana*, Mey.). — Of frequent occurrence at Northwood, Mill Hill, and Chalfont, but usually only observed towards evening when it flies over the tops of sallow bushes. End of May and June, and specimens have sometimes been captured in August.

Grapholitha minutana, Hübn. (*Hedya minutana*, Wilk.; Staint. *Cydia minutana*, Mey.).—One example of this species was reared from a pupa found in a spun-up leaf of grey poplar at Northwood in the month of June.

Grapholitha trimaculana, Don. (*Hedya trimaculana*, Wilk.; Staint. *Cydia trimaculana*, Mey.).—This very variable species abounds during the summer months among elms in all places. On the fences near the Kingsbury Station almost every gradation in the variation of the species was obtainable in 1883, a year in which the insect was even more abundant than usual.

Grapholitha pencleriana, Fisch. (*Lithographia penkleriana*, Wilk.; Staint. *Epiblema penkleriana*, Mey.).—Only obtained at Chalfont and Chesham in July.

Grapholitha nævana, Hübn. (*Steganoptycha nævana*, Wilk.; Staint. *Endemis nævana*, Mey.).—Not uncommon amongst holly wherever that plant is established, but the species was of annual occurrence in St. John's Wood, in gardens where there was not any holly. August.

Phlœodes tetraquetrana, Haw.; Wilk.; Staint. (*Epiblema tetraquetrana*, Mey.).—Only noted from Northwood, but probably occurring in other wooded localities also. Generally a high flyer, and is on the wing around birch trees in the late afternoon during the month of May.

Hypermecia cruciana, Linn. (*H. angustana*, Wilk.; Staint. *Enarmonia cruciana*, Mey.).—Bred from sallow obtained at Mill Hill, Northwood, and Rickmansworth.

Batodes angustiorana, Haw. (*Ditula angustiorana*, Wilk.; Staint. *Capua angustiorana*, Mey.). — Appears to be pretty generally distributed and sometimes very common.

PÆDISCA OPPRESSANA, Tr. (*Pœcilochroma oppressana*, Wilk.; Staint. *Enarmonia oppressana*, Mey.).—Common in June and July on trunks of aspen at Mill Hill, but not observed elsewhere.

PÆDISCA CORTICANA, Hübn. (*Pœcilochroma corticana*, Wilk.; Staint. *Enarmonia corticana*, Mey.).—Very common and exceedingly variable. At Northwood the specimens exhibit a greater colour variation than in any other place in the area here referred to.

(To be continued.)

NOTES AND OBSERVATIONS.

TÆNIOCAMPA STABILIS IN WINTER.—As bearing on the question of the autumnal emergence of the genus *Tæniocampa*, to which attention has been called (*ante*, p. 97), I may mention that I took a single male specimen of *T. stabilis* on an oak-trunk near here on Dec. 13th, 1893. The weather was very mild. I took *Cerastis vaccinii* the same evening. *Cheimatobia brumata* was abundant. As illustrating the mildness of the season, I may mention that I gathered two heads of Narcissi in bloom out of doors on the same day.—F. J. BRIGGS; Fursdon, Crown Hill R.S.O., S. Devon.

DIPTERA IN NOTTINGHAMSHIRE. — Mr. Percy H. Grimshaw has published in 'The Naturalist' (pp. 89–103, March and April, 1898) a preliminary list of Diptera occurring in Nottinghamshire. Over 240 species are enumerated, and of these by far the larger proportion are from one locality alone—South Leverton.

VARIATION IN CALYMNIA TRAPEZINA IN RUSSIA. — Several forms are noted as occurring during July, 1897, near Moscow. The specimens were captured upon sponges soaked in beer and sugar. Besides the type, unicolorous light yellow forms were met with which were without the usual black specks. Most were reddish or grey, with the light or darker central fascia common to the species. One variety, however, is exceptionally noticeable in its departure from the type. The ground colour is muddy grey, closely dusted with black, so much so that the stigmata cannot be made out, while the fascia exists as a broad black band; the hind wings are clear blackish grey, with light yellow fringes. Other examples closely approach *C. affinis* in ground colour and markings. It would appear that *C. trapezina* is not generally considered to be a very variable species in Eastern Europe.—A. LINDE, in 'Societas Entomologica,' xii. 130.—W. M.

A MEXICAN WAX-SCALE IN ENGLAND.—Dr. K. Jordan has just sent me specimens of a *Ceroplastes*, found at Tring on an orchid, *Chysis aurea*, Lindl., which had just been imported from Mexico. It proves to be *Ceroplastes cistudiformis*, Towns. MS., Ckll. (Zoe, 1893, p. 104), which was described as a subspecies of *C. psidii*, but is now regarded as a distinct species. Dr. Jordan's find is especially interesting, because this scale was hitherto known only from the original specimens collected by Dr. A. Dugès at Guanajuato, Mexico, and had never been found on orchids. The genus *Chysis* is native in Mexico, but the particular species, *C. aurea*, is given as from Chili in the 'Index Kewensis.'—T. D. A. Cockerell; Mesilla Park, New Mexico, U.S.A.

Larva of Cidaria sagittata.—Mr. H. F. Fryer (Ent. Mo. Mag. for April, p. 76) relates his observations on the feeding habit of the larva of *C. sagittata* in a state of nature. He states that when young it feeds on the flower-parts of its food plant, *Thalictrum*, and afterwards on the seeds, never touching the leaves, except when the supply of seeds runs short. This seems to be somewhat at variance with the recorded observations of other entomologists. It has been generally understood that the larva eats not only the seeds, but also the leaves, which it causes to wither by gnawing the stems.

CAPTURES AND FIELD REPORTS.

Nyssia hispidaria.—I am informed by Mr. W. J. Lucas that a specimen of *Nyssia hispidaria* was obtained by Mr. B. G. Cooper, near Oxshott in Surrey, on March 28th; and that *Brephos parthenias* was well out in the same district on April 3rd.—Richard South.

Captures at Watford.—On April 7th I found a female *Amphidasys striataria* (*prodromaria*) on a fence in this neighbourhood; and on April 2nd I captured a male *Tæniocampa populeti* at sallow, also in this neighbourhood.—P. J. Barraud; Bushey Heath, Watford.

Pieris rapæ.—On March 26th a rather small female *Pieris rapæ* emerged from a pupa which was bright emerald green in colour, and was found attached to a leaf of white jessamine in a garden in Kingston-on-Thames.—W. J. Lucas.

Lycæna (Polyommatus) alexis (?) in February.—Mr. Sydney Webb reports that a blue butterfly was seen by his son in the grounds of Dover College, on Feb. 15th. The identity of the insect was not ascertained by Mr. Webb, but he is of opinion that it was "a prematurely emerged *L. icarus* (*P. alexis*), the larva of which must have fed up instead of hybernating" (Ent. Mo. Mag. April, p. 87).

Entomology at Interlaken.—I should like to call the attention of lepidopterists who may be working on the Continent this season to a collecting-ground at Interlaken which abounded with Rhopalocera during the short time I was able to spend on it. I was most kindly directed to this ground by a stranger, who said he had often collected insects for gentlemen, and seemed to be a well-informed, practical entomologist. I reached the ground by walking from the Hotel National, where I was staying, to the street in which the Kursaal is situated, then turning to the left and keeping straight on. This brought me into the open country, with fields on one side and rising ground on the other. The best part of the collecting-ground was a rough, steep hillside, covered with scanty vegetation, but with plenty of insect life to enliven it. I was much delighted to see *Callimorpha hera*, so rare in this country, flying about in the blazing sunlight and settling on the plants. *Parnassius apollo* was another fine species found in this place, and in an adjoining wood I obtained *Vanessa c-album* in perfect condition, while *Leucophasia sinapis* was plentiful, several often being on the wing at once. Unfortunately, having only one day's collecting, I was unable to work the place fully, or more species might have been obtained. In addition to the insects just noted, the following were taken on this occasion:—*Gonopteryx rhamni*, *Melanippe galatea*, *Argynnis dia*, *Thecla w-album*, *Polyommatus argiolus* (worn), *P. acis* (female), and a *Limenitis*, probably *L. camilla*.—GRAHAM RENSHAW; Sale Bridge House, Sale, Manchester.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON. — *April 6th*, 1898. — Mr. R. McLachlan, F.R.S., Vice-President and Treasurer, in the chair. Sir Archibald Buchan-Hepburn, Bart., of Smeaton-Hepburn, Prestonkirk, E. Lothian, N.B., was elected a Fellow of the Society. On behalf of Mr. Greenshields, Mr. Jacoby exhibited specimens of the longicorn beetle, *Micropsalis durnfordi*, Burm., from Patagonia. Mr. Greenshields, who was present, stated that this species, remarkable for the great development of the palpi, was originally taken by Darwin; his own examples were taken hiding in thorny bushes in a dry water-course. Mr. Champion exhibited European examples of *Harpalus frohlichi*, a newly discovered British species. Mr. B. O. Bower showed living larvæ of *Caradrina ambigua*, an insect which had recently occurred in England in countless numbers. They were bred from ova laid by a female taken on the South Devon coast, and fed indiscriminately on low plants. Mr. M. Burr read a paper supplementary to Mr. Green's previous communication on *Dyscritina*, and referred the imagos definitely to the genus *Diplatys*, *D. longisetosa*, Westw., being a good species, and Mr. Green's new form proving to be *D. nigriceps*, Kirby. Dr. Chapman read a paper on the larva of *Eriocephala allionella*, which he stated to be essentially similar to that of *E. calthella*, previously described by him.—W. F. H. BLANDFORD, *Hon. Sec.*

CITY OF LONDON ENTOMOLOGICAL SOCIETY.—*March 15th*, 1898.—The Rev. C. N. Burrows exhibited a series of *Calligenia miniata*, showing considerable variation, some with scarcely any black markings on the fore wings, some orange, and two quite yellow in colour, instead of the usual pink or pale red. Mr. A. W. Mera, a cocoon of *Eriogaster lanestris*, which he had broken into, and in which he had found the larval skin of the caterpillar, two pupa-cases of parasitic Diptera, one large and one small, and the attenuated corpse of the dipteron which had emerged from the larger pupa, but which had not been able to escape from the compact walls of the cocoon. The lid of the smaller pupa-case was raised, and the legs of a dipterous imago protruded, but the fly had died in the skin, there being no room for its emergence. Mr. L. B. Hall exhibited *Enoplops scapha*, a large bug, and four beetles, *Athous difformis* (male and female), a species only found in the South of England, the female being very scarce, and having the thorax more spherical than the male; male and female examples of *Campylus linearis*. In this latter species the female is scarcer than the male, and has the elytra generally black, with testaceous borders, the elytra of the male being testaceous. All five insects were captured at Hastings.

Mr. H. Heasler exhibited a series of *Scaphidium 4-maculatum* taken under a rotten oak-log at West Wickham in February. The under sides of the male and female were shown, the centre of the metasternum of the male being depressed and pubescent; series of *Agathidium varians*, taken under a decayed branch at West Wickham, in which the male has the left mandible produced; a peculiar character which is present in varying stages of development in other members of the same genus (the members of the genus have the power of rolling themselves up into a ball); also several specimens of *Ennearthron affine* taken in two small pieces of dry boletus. Mr. E. M. Dadd read a paper translating and summarising Standfuss's work on 'Causes of Variation.' Discussion followed, especial interest being shown in the author's definitions of albinism and melanism. Mr. Tutt, Dr. Chapman, and Messrs. Prout, Nicholson, and H. Heasler took part, Dr. Chapman being of opinion that the reason why albinic specimens occur sporadically, whereas melanic tend to increase and found a race, might be explained by the fact that albinism is a sign of weakness in the individual, whilst melanism is the result of special vigour, and thus albinos die off, but melanic individuals transmit their variation to their progeny.—H. A. Sauzé, *Hon. Sec.*

Lancashire and Cheshire Entomological Society. — *March* 14*th*, 1898 (Meeting held in the Free Library). — The President, Mr. S. J. Capper, F.E.S., F.L.S., in the chair. There was an excellent attendance of members. Mr. Mosley, F.E.S., Curator of the Huddersfield Museum, read a paper "On a new method of arranging a collection of Insects, with special reference to Lepidoptera." He pointed out that four main objects should be kept in view—(1) Economy of space and of expense; (2) facility in exhibition and examination of specimens; (3) preservation from destructive agencies (*e. g.* mites, &c.); (4) avoidance of unlimited destruction of life. In expanding his four main points, he especially disclaimed any idea of diminishing the existing large collections, and was of opinion that every town should have a large students' collection arranged in the ordinary way in cabinets. At the same time he advocated a new system of arranging one or two specimens in flat glazed tablets, showing also the life-histories either by the preserved larva and pupa, or by drawings of these stages; this he maintained was a cheaper method, saving space and expense; and secondly, the insects being near to the glass, could easily be examined by a lens without opening the tablet; at the same time the tablet could be held in one hand and the lens in the other; two specimens could easily be compared; all alteration due to inserting or increasing a series is saved; and the cases, being hermetically sealed, are secure from the attacks of mites, &c. Such a collection, he maintained, would be specially useful to teachers, and would help to lessen the destruction of species by making "long series" unnecessary, He then dwelt upon the objects of the larger collections, and expressly stated that he designed this smaller form of collection merely as an index to the larger. After showing three mounts in this tablet form, and giving particulars as to actual cost and arrangement of the tablets, he dwelt upon the advantage of drawings of varieties and aberrations, which, with notes on the species, could be kept in the same form. He concluded his paper by a short reference to other groups besides the Lepidoptera, and suggested that an index collection such as this would be useful in museums. In the discussion which ensued, the President, and Messrs. Pierce, Moss, Freeman, Cotton, Gregson, Loche, Wilding, and Webster made suggestions, and criticised the methods of the speaker. Mr. Capper exhibited a remarkable variety of *Zygæna lonicera;* Mr. Prince, spring captures; Mr. Saxby, *Acherontia atropos* and *Smerinthus populi;* Mr. Moss, preserved larvæ; Mr. Johnson, an excellent series of varieties of *Arctia caia*, bred in January last, some of which were very dark specimens. Mr. Pierce exhibited a fine living example of *Periplaneta australasiæ;* and Mr. Freeman, eggs of *Orthosia macilenta.*

April 4th.—The President in the chair.—Mr. F. W. Saxby gave a lecture on Photomicrography of Insect-structures. He used for illumination a very powerful jet of acetylene gas. In describing the apparatus he referred to this gas, jet, the doublet condenser, the microscope without eye-piece, the sleeve connecting the microscope with the camera, and lastly the camera itself. He afterwards photographed a slide of the vertical section of the compound eye of *Eristalis tenax.* The negative (developed in the building) showed well the many lenses with interspersed hairs, the optic nerves, &c. The lecturer, assisted by Messrs. Pierce and Freeman, then exhibited several slides of insect anatomy, among which were frenula and tentacula of a hymenopteron; front tarsi of *Dytiscus marginatus.* Mr. Webster exhibited Papilios from Lagos. Dr. J. Cotton exhibited a very long series of *Grammesia trilinea* var. *bilinea*, concerning which the President made a few remarks.

Birmingham Entomological Society.—*March 21st*, 1898.—Mr. G. T. Bethune-Baker in the chair. Mr. J. T. Fountain showed a locust found in imported vegetables at King's Norton, and which had been identified by Mr. Malcolm Burr as *Acridium ægyptium.* Mr. P. W. Abbott, a short series of *Phorodesma bajularia* from Wyre Forest; a specimen of *Grammesia trigrammica* with the outer half of the wings from the median bar very dark, and the inner half light; also a series of *Hecatera dysodea* from the fens. He also showed a series of the Cornish *Lycæna arion* for comparison with some also exhibited by Mr. G. T. Bethune-Baker from the Gloucester locality. The Cornish ones were distinctly brighter, of quite a distinct type of blue, much gayer looking specimens. Mr. Bethune-Baker's specimens were taken in 1896, like the Cornish ones. Mr. Bethune-Baker also showed specimens from Switzerland, the Amoor &c., all more like the Gloucester than the Cornish specimens; distinctly dark varieties from Switzerland, the Ural, &c., var. *alpina*, and var. *obscura* from the Alps, and var. *uralensis*, in which the blue had nearly disappeared, from the Ural; also a number of other similar species of *Lycæna* from Europe and Asia. Mr. R. C. Bradley read a paper on the Aculeate Hymenoptera, illustrating it with eight boxes of insects, and some very good diagrams which had been drawn by Mr. A. H. Martineau. Mr. A. H. Martineau showed a box full of nests &c. of Aculeates in wood and pierced stems, also in illustration of Mr. Bradley's paper.—Colbran J. Wainwright, *Hon. Sec.*

RECENT LITERATURE.

Proceedings of the South London Entomological and Natural History Society, 1897. Part II. Together with the President's Address. Pp. i–xvi, 69–166.

The second part of these 'Proceedings,' extending to 114 pages, embraces the papers read before the Society during the latter part of 1897 and in January, 1898; and also the full reports of the meetings throughout the session, and other matters. The papers are:—"Recent Examples of the Effect on Lepidoptera of Extreme Temperature applied in the Pupal Stage," by F. Merrifield; "The Drinking Habits of Butterflies and Moths," by J. W. Tutt; "The Wing and Larval Characters of the Emperor Moths," by Prof. A. Redcliffe Grote; and "Notes on Hybrids of *Tephrosia bistortata*, Goetze, and *T. crepuscularia*, Hb.," by J. W. Tutt. In the President's Address the usual matters connected with the Society are referred to, the entomological work of the year reviewed and co-operation of workers in different branches of natural history advocated. We are pleased to note that the affairs of the Society continue in a very satisfactory condition, and that the membership is well on the way towards 200 in number.

Economic Entomology.

England.—*Report of Observations of Injurious Insects and Farm Pests during the year* 1897, *with Methods of Prevention and Remedy.* Thirty-first Report. By Eleanor A. Ormerod. Pp. i–viii, 1–160. 1898. London: Simpkin, Marshall, Hamilton, Kent & Co. Limited. Many illustrations, and a portrait of Miss E. A. Ormerod.

America.—*Report of the Entomological Department of the New Jersey Agricultural College Experiment Station.* By John B. Smith. For the year 1897. Pp. 96. Eight plates and other illustrations in the text. Trenton: The John L. Murphy Publishing Co. 1898.

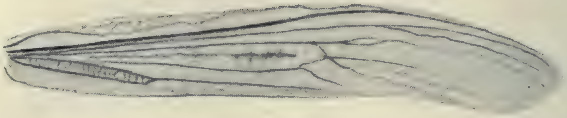
The Codling Moth (*Carpocapsa pomonella*). By M. V. Slingerland. Cornell University Agricultural Experiment Station, Ithaca, New York Entomological Division. Bulletin No. 142. January, 1898. Pp. 69. Illustrated.

Preliminary Notes on the Codling Moth. By T. D. A. Cockerell. Agricultural Experiment Station, Mesilla Park, N.M. Bulletin No. 25. February, 1898. Pp. 22.

The Peach Borer: Experiments with Hydraulic Cement. By John B. Smith. New Jersey Agricultural Experiment Station. Bulletin No. 128. February, 1898. Pp. 28. Illustrated.

Some Miscellaneous Results of the Work of the Division of Entomology. Prepared under the direction of L. V. Howard. Pp. 98. Illustrated. Bulletin No. 10, New Series. U. S. Department of Agriculture. Washington. 1898.

Recent Laws against Injurious Insects in North America, together with the Laws relative to Foul Brood. Compiled by L. O. Howard. Pp. 68. Bulletin No. 13, New Series. U. S. Department of Agriculture. Washington. 1898.



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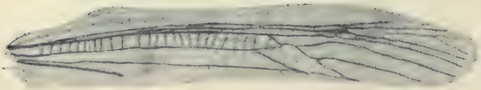

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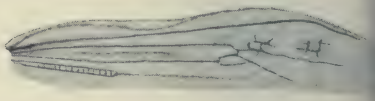

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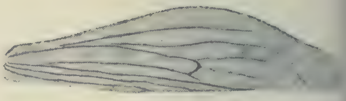

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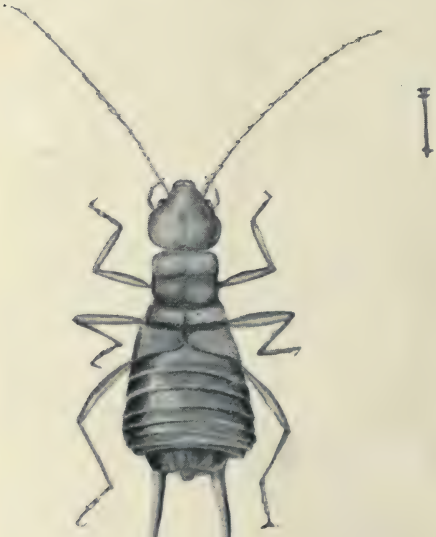

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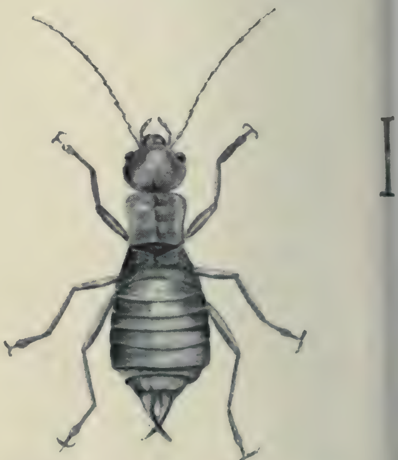

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Fig. 1. *Chelidura acanthopygia* ♂
Fig. 2. ,, ,, ♀

Fig. 3. *Stenobothrus bicolor* ♀
Fig. 4. ,, ,, ♂

Fig. 5. *Stenobothrus biguttulus*
Fig. 6. ,, ,,

THE ENTOMOLOGIST

Vol. XXXI.] JUNE, 1898. [No. 421.

ORTHOPTERA NOT YET BRITISH.

By Malcolm Burr, F.Z.S.

(Plate II.)

The following short notes are not uttered in the spirit of prophecy, but rather to direct the attention of entomologists collecting in Britain to certain species which, judging from their general distribution, we may not unreasonably expect to be taken in this country. The three species which seem to me to be most likely to be discovered are one earwig and two grasshoppers, namely, *Chelidura acanthopygia* (Gènè.), *Stenobothrus biguttulus* (Linn.), and *Tettix fuliginosus* (Zett.).

Chelidura acanthopygia (Gènè.).—The general appearance of this earwig may be seen from the figure. It is quite different from any of the species at present on the list as British. It is small, dark dirty brown in colour, with rudimentary elytra, and no wings. In the male the forceps are semicircular in shape, and unarmed, the apices nearly meeting, the branches slender and remote at the base. In the female the branches of the forceps are contiguous at the base, slender, straight, and unarmed, touching throughout their whole length, and crossing slightly at the apex. The chief points which distinguish it from its congeners are the broad abdomen, narrower at the apex, and the form of the subanal plate of the male, which is armed with a small blunt projection, sharply curved. This is not easy to distinguish at first, but can be seen from beneath with a lens.

According to Brunner, in the early part of the year it is to be found under stones and dried leaves, and later in the season on shrubs and brambles. It occurs in Europe from Belgium to the Mediterranean, and is found in the North of France. It seems to prefer elevated regions, and might well be taken on the Downs.

STENOBOTHRUS BIGUTTULUS (Linn.).—This species, with the common English *S. bicolor* (Charp.), form a group of *Stenobothrus* quite distinct from all the other species of the genus. This is Brunner's fourth group, characterised by the dilated mediastinal area of the elytra and the sharply angled ridges of the pronotum.

Charpentier [*] was the first to recognize the distinction between the two species, but they were united as one by Fieber and by Fischer. Excepting Philippi,[†] de Selys Longchamps,[‡] and Brisout,[§] all authors regarded them as one, until Brunner carefully distinguished them in his invaluable 'Prodromus der Europäischen Orthopteren.' Orthopterists have since followed Brunner, and we owe to Krauss [||] an excellent essay on the two species.

In his first work on French Orthoptera, Finot [¶] allows himself to say that "Il m'est impossible de faire la séparation d'une manière certaine," but in his later and more comprehensive book [**] he distinguishes them after Brunner.

The difference between the two species lies in the venation of the elytra.

In his synoptical table of the genus Brunner gives the following points of separation :—

6. Area externomedia elytrorum haud ampliata, venis radialibus rectissimis. Area scapulari elytrorum vena longitudinali spuria instructa, venulis transversis rectis . . . . . . *bicolor.*

6. 6. Area externomedia ampliata, venis radialibus prima et secunda subflexuosis. Area scapulari el. vena spuria nulla, venulis transversis valde flexuosis . . . . *biguttulus.*

These points are subtle enough, but with a hand lens are quite distinct. In the male *biguttulus*, the anterior radial, as I prefer to call Brunner's externomedial area, is far more strongly arched than in *bicolor;* the actual marginal vein is stronger and thicker. In *biguttulus* the first and second radial veins are wavy, whereas they are quite straight in *bicolor.*

The females are somewhat more difficult. In *biguttulus* the scapular area has no extra, adventitious or spurious vein, and the small cross veins are distinctly wavy; in the female *bicolor* the scapular area is furnished with a small spurious vein running parallel with the radial veins, and the small transverse veins are straight.

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[*] 'Horæ Entomologicæ,' 1825, 161.

[†] Orth. Berol. 1830, 36, tab. ii. fig. 6.

[‡] Ann. Soc. Ent. Belg. vi. 51; xi. 31.

[§] In Yersin, "Extraits d'une lettre adressée à M. L. Brisout sur les Orthoptères d'Hyères," Ann. Soc. Ent. France (3), iv. 1856, 48, note.

[||] Verh. z.-b. Ges. Wien, 1886, xxxvi. 141, tab. v. figs. 4 and 5.

[¶] Orth. de la France, 1883, 60.

[**] Faune de la France, Ins. Orth.

Brunner lays too great stress upon the importance of the presence of a small black spot on the elytra of *biguttulus* where the marginal vein meets the radial vein. Krauss observes that this is also to be seen in *bicolor*, as I myself have noticed.

Krauss criticises Brunner's diagnosis, and re-establishes it as follows:—

STENOBOTHRUS BIGUTTULUS (Linn.).—♂. Elytra valde dilatata, margine antico arcuato-producto, area scapularis et externomedia ampliatæ, nitentes, pellucidæ, venæ radiales prima et secunda subflexuosæ. ♀. Elytra paululum dilatata, margine antico arcuato, area scapularis leviter ampliata.

STENOBOTHRUS BICOLOR (Charp.).—♂. Elytra parum dilatata, margine antico arcuato, haud producto, area scapularis parum, area externo-media haud ampliata, venæ radiales prima et secunda rectissimæ. ♀. Elytra valde attenuata, margine antico subrecto, margine postico parallelo, area scapularis haud ampliata, angusta.

Mr. Eland Shaw * was the first to recognize the fact that it is not at all improbable that *S. biguttulus* should occur in this country. In my 'British Orthoptera" † I have referred to this chance, and given, very briefly, the points of distinction.

On the Continent *S. bicolor* is the commoner species, and occurs in fields and open places, whereas *S. biguttulus* is found in woods. *Bicolor* is found throughout Europe from the most northern districts to the Mediterranean Sea; *biguttulus* is distributed, according to Brunner, from Scandinavia to the Alps, but does not occur in the extreme south. Finally, the stridulation of the two species is quite separate, but I cannot give the distinction, as I am not familiar with the chirp of *biguttulus*, which is due to the difference of venation.

TETTIX FULIGINOSUS (Zett.).—This rare species is at present only known from Norway, Lapland, and Siberia, but it might very well occur in the North of Scotland. It is considerably larger than either of the two known British species of the genus. Together with *Paratettix meridionalis* (Ramb.) it differs from *subulatus* in having the keels of the middle femora with the edges wavy, whereas they are straight in *subulatus*. With *subulatus* it differs from *biguttatus* in having the pronotum more or less flattened and not so tectiform as in the latter species, and in having the central keel considerably less elevated. (*Meridionalis* is essentially a southern species.) *Fuliginosus* further differs from *subulatus* in having the under part of the hinder tarsi sharply cut off into separate pads. This point is somewhat difficult to distinguish. Only the female is known to Brunner, who gives the dimensions as follows:—Length of body, 11 mm.; length of pronotum, 15 mm.

Bellagio, East Grinstead: May 9th, 1898.

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* E. M. M. xxv. 1889.

† Page 37.

NOTES ON *SPHŒRIA LARVARUM*, Westw.

By George Howes and W. W. Smith.

When staying at Orepuke, a small mining town fifty miles from Invercargill, I took the opportunity of visiting the gold-sluicing claims situated about one mile from the township, in what was at one time a large creek-bed, but which, when the miners started working at it, had long been filled in. The gold is in a black iron-sand which is found in two thin layers of shingle, one about fifty feet below the surface, the other about five feet below it. To reach the gold the earth has to be all washed away, and in washing it away large quantities of dead trees, ferns, and flax are washed out. In the trunks of the trees numerous specimens of the vegetating caterpillar (*Charagia virescens*, Walk.), called by the Maoris "aweto," are found. One of the miners gave me two, each four inches long, but they had been kept for a month in a tin, and had become very shrivelled. The miner told me that when taken from the logs under the earth they appear to be quite fresh and fat, and almost look as if they had just been killed; yet they must have been buried in the earth for hundreds of years, for above them trees were growing of a very considerable age.

The fungus which attacks the caterpillar sends out a stalk from its eye, which in the case of the two I possess is nearly two inches long. The body of the caterpillar becomes filled with a white woody substance, which preserves its shape. The logs they are found in are those of the rata tree (*Metrosideros lucida*). So far as I know, this is the first record of its occurrence in a semi-fossilized state.

George Howes.

Invercargill, New Zealand: Jan. 3rd, 1898.

The valuable note on this remarkable vegeto-animal parasite by my young friend Mr. George Howes supplies an important item in the history and distribution of the species in New Zealand. In addition to its being the first record of the occurrence of *S. larvarum* in the South Island, it is, as Mr. Howes observes, the only record of its occurring in a semi-fossilized condition. The interesting discovery will also definitely settle the vexed question of the identity of the insect-host of this fungus. For some years doubt has been expressed by some entomologists in regard to the larva of *Charagia virescens* being the host of *S. larvarum*. The last to doubt its identity was the late Mr. A. S. Olliff, Entomologist to the Government of New South Wales. In a valuable illustrated paper on 'Australian Entomophytes,' Mr. Olliff discussed the question, and quoted from several authors in support of his conclusions. The late Mr. A. H. Scott, author of 'Australian Lepidoptera and their Transformations,' is thus quoted by Olliff:—"We think it probable that the stems and trunks of *Metrosideros* furnish sustenance for the larvæ of the *Charagia virescens;* but these live and undergo their metamorphoses *within* the wood, effectually protected against injury from this particular fungus; and it is equally probable that the *external* portions of the finer roots of the same or neighbouring plants afford nutriment to the larvæ of such genera as pass their lives wholly in the earth, a state of existence which would render them exposed to the attacks of the *Sphœria* (*Cordyceps*)." Scott also stated that the host of *S. larvarum* has been incorrectly identified with the larvæ of *Charagia* by Hooker, Dieffenbach, Doubleday, and Taylor. To these conclusions Mr. Olliff added:—"In my opinion we have in these remarks the truth of the matter, and I am inclined to go even further, and to assert that all the larger fungi of the genus *Cordyceps* live upon, and at the expense of, subterranean larvæ and pupæ. In support of this assertion I would point to the fact that all the bulky species of which the hosts are definitely known have been found on root-feeding insects. As instances, I need only cite the Dynastidæ, Melolonthidæ, Elateridæ, and Lucanidæ amongst the beetles, *Cicada* amongst the Homoptera, and *Pielus* and *Trictena* amongst the moths. In all these cases the hosts are subterranean, and it follows that it is idle to speak of any connection between these parasitic fungi and the larvæ of wood-boring or foliage-eating and free living insects. The best known and the most abundant species are found on the early stages—larvæ and pupæ—of *Lepidoderma*, *Lepidiota*, *Rhyssonotus*, *Cicada*, *Pielus*, and *Trictena*, all of which live underground at the roots of plants. It is obvious," says our author, "that it would be impossible for large and highly-developed fungi, such as *Cordyceps*, which are sometimes of large dimensions, and which are frequently found growing at right angles to the axis of the body of their host, to grow within the narrow limits of the burrows made by these larvæ within their food-plants." These remarks also embody the opinions of a number of eminent entomologists.

Mr. Howes was careful to ascertain that these large larvæ with partially developed *S. larvarum* attached were found *in situ*, and were carefully extracted from the buried logs of *Metrosideros lucida*. Notwithstanding that they have been entombed for centuries, the fact appears incontrovertible that the parasitic *Sphœria* attacks and partially develops on the larvæ of *Charagia* within their burrows in the rata timber. There is no lepidopterous or other larvæ known to attain the size of those of *Charagia virescens* in New Zealand. The larvæ of the large longicorn beetle (*Prionoplus reticularis*) burrows in several timbers, but is free—at least so far as is known at present—from the attacks of *S. larvarum.* The larvæ of *Charagia virescens* are the only known forms to attack rata timber. From the researches of Sir Walter Buller, it is evident that the *Sphœria* occurs in many parts of the native forests in the North Island away from rata trees (Entom. 1895, 174). A perfect examination of the habitats of *S. larvarum*, and of the various sized larvæ found attacked by this entomophyte, is indispensably requisite in order to ascertain if one or more species of larva is attacked.

The numerous empty burrows of various depths of *Charagia virescens* occurring in rata trees suggest that the larvæ were attacked by the *Sphœria* and sickened, and left their burrows to perish in the humus around the trees where the fungus flourishes. My young friend's interesting discovery of the *Charagia* larvæ in the rata logs places the matter beyond doubt that they are occasionally attacked by *S. larvarum* in their burrows.

W. W. Smith.

Ashburton, New Zealand: March, 1898.

SOME NEW COCCIDÆ OF THE SUBFAMILY LECANIINÆ.

By T. D. A. Cockerell, N. M. Agr. Exp. Sta.

Pulvinaria marmorata, n. sp.

♀. With ovisac 11 to 13 mm. long, the scale itself 4 mm.; ovisac 3 mm. broad, cylindrical, firm, scarcely grooved, not adherent to objects which touch it; shrivelled female marbled with ochreous and black, margin dark, dorsum with a broad light longitudinal band, patches of glassy secretion here and there. Eggs pale yellow with a slight pinkish tinge.

♀. Boiled in caustic potash, stains the liquid light brown. Skin colourless, legs and antennæ yellow-brown. Antennæ 8-segmented, formula (13)248(56)7; first four segments not far from equal, 2 about two-thirds the length of 3. Rostral loop short. Legs ordinary; femur more than twice as thick as tarsus; tibiæ about three-fifths length of tarsus. Claw stout, rather long; all the digitules slender. Margin with short simple spines, few in number.

♀. Before forming ovisac *Lecanium*-like, very convex, 4½ mm. long, 3 wide, 3 high, yellowish brown, speckled with black, with many little nodules of glassy secretion; back with a broad light band, across which dark lines mark the sutures between the segments. Younger examples are light yellowish, nodulose, with hardly any dark mottling.

Hab. Dripping Spring, Organ Mts., New Mexico, April 24th, 1898 (*Ckll.*). It occurs on a small bushy perennial herbaceous plant, which I have not seen in flower. It has sublinear leaves dotted with glands.

From *P. marmorata* I bred a female parasite, *Coccophagus lecanii* (Fitch).

Lecanium (*Calymnatus*) *impar*, n. sp.

♀. Scale flat, 2½ mm. long, 1½ broad, dark chestnut-brown, with delicate raised lines radiating from the margin. Outline oblong or suboval, but always inequilateral, one side being nearly straight, the other well rounded out.

♀. After boiling semi-transparent, very light brown, not divided into plates, but segmentation visible at the margins. Skin not reticulated; sparsely beset with minute glands; a broad marginal area thickly beset with rather large hyaline spaces, arranged mostly in irregular rows radiating from the margin, often double. Anal plates with their outer sides about equal. Posterior cleft quite long. Two more or less distinct rows of large hyaline spaces in the middle line, between the anus and the mouth; these spaces are often small and in little groups, and when large they exhibit small round gland-spots upon them. Margin with extremely minute simple bristles, very few in number. Stigmatal spines in threes, short, sunken wholly beneath the lateral margin of the scale. Rostral loop very short. Legs and antennæ well formed, colourless; antennæ 6-segmented, 3 very much longest, longer than $1 + 2$, and usually longer than $4 + 5 + 6$; formula 3261(45); 2 and 3 each a pair of bristles near the end. Legs slender, femur rather short, tibio-tarsus long, the tarsus about two-thirds the length of the tibia, but the articulation very obscure, often not discernible, and as the tarsus is constricted near its middle, there seems to be a very long tibia with an extremely short tarsus. Tibia and tarsus each with a strong bristle not far from the end; tarsal digitules filiform but moderately stout, with distinct knobs; claw digitules stout, extending far beyond claw. The females studied contain embryos.

Hab. Las Minas, Tabasco, Mexico, June 3rd, 1897, on leaves of "Escobillo" (*Townsend*). Sent by Dr. L. O. Howard; Div. Entomology, No. 7808. Some are infested by a parasitic fungus, apparently an *Aschersonia*. *L. impar* is allied to *L. acuminatum*, Signoret. Superficially it looks a good deal like *L. tessellatum*.

Lecanium (*Eulecanium*) *subaustrale*, n. sp.

♀. Scale 6½ mm. long, 3 wide, 2⅓ high; very like *L. magnoliarum*, but rich dark ferruginous or chestnut colour, instead of brown, and without any blackish marbling; surface rather shiny, rugose and faintly tuberculate, not distinctly tuberculate as in *magnoliarum*. Much roughened at the sides, but not punctured as in *L. quercifex*. A hardly noticeable tendency to a dorsal keel. Skin (after boiling, by transmitted light) yellowish, chitinous, tessellated in the *Eulecanium* manner, with round gland-pits of various sizes, some quite large. Legs well formed, slender, coxa quite long, tibia hardly longer than tarsus with claw; claw stout; all the digitules filiform, with small but distinct knobs; digitules of claw extending considerably beyond the claw-tip, and a little beyond tip of tarsal digitules. Margin with simple spines at very long intervals. Antennæ broken in the specimens studied.

Hab. Amecameca, Mexico, June 7th, 1897, on *Celtis occidentalis* (?), infesting the twigs (*A. Koebele*, No. 1758). Sent by Dr. L. O. Howard; Div. Ent. No. 7923. *L. subaustrale* is not related to any species known from the same region, but resembles several European forms — *L. elongatum*, *genistæ*, *berberidis*, and *mori*.

Lecanium (*Toumeyella*) *tubuliferum*, n. sp.

♀. Scale 5½ mm. long, 4¼ broad, 4 high, when dried; but evidently larger when fresh, as it is distorted and shrunken from drying. Four dorsal longitudinal rows of pits, and many small pits at the sides. Colour light brown, rufescent towards the margin. Surface with a thin, inconspicuous, easily deciduous, glassy covering.

♀. Boiled in caustic potash, gives a dark madder-brown colour. After prolonged boiling the skin becomes transparent, suffused with brown, but not chitinous. It is very thickly beset with small tubular glands. There are also some large glandular patches, and in places immense numbers of bulbous glands, looking like knobbed processes. Antennæ rudimentary, minute, brown, bristly at tip. Legs absent. Margin, at least in an immature example, with very small spines at rather long intervals.

Hab. On twigs of *Quercus engelmanni*, with *Kermes grandis*, Amecameca, Mexico, May 25th, 1897 (*Koebele*, No. 1756). Sent by Dr. Howard; Div. Ent. 7920 (in part).

Lecanium perconvexum, n. sp.

♀. Scale 3¼ mm. long, 2¼ high, 2 wide; very convex, brown-black, not very shiny; with minute specks of a lighter colour, and irregular patches of dull white waxy secretion, especially at the sides.

♀. Antennæ represented by a short thick bristly protuberance. Legs very short, stout, tapering, with about the form of a carrot, femur and tibia broader than long. Skin chitinous, yellowish brown, with numerous large round and oval gland-pits, and some small glands interspersed. Marginal spines very small, simple.

♂. Scale very small, scarcely over 1 mm. long, about ⅝ mm. broad, pale brownish, shiny, wrinkled, covered with a coating of dull white secretion, which is easily deciduous.

Hab. On *Nectandra*, Campinas, Brazil, Dec. 20th, 1897 (*F. Noack*). I sent Dr. Noack a more detailed account to publish in Brazil, but the essential characters are here given for the greater convenience of students. *L. perconvexum* is related to *L. punctatum*, *scrobiculatum*, *imbricatum*, and *urichi*.

Mesilla Park, New Mexico, U.S.A.: April 28th, 1898.

TORTRICES OCCURRING IN THE VICINITY OF THE CHESHAM LINE.

(Concluded from p. 119.)

Pædisca profundana, Fabr. (*Pœcilochroma profundana*, Wilk.; Staint. *Eucosma profunda*, Mey.). — Only observed at Northwood.

Pædisca ophthalmicana, Hübn.; Wilk.; Staint. (*Epiblema ophthalmicana*, Mey.).—Larvæ common in rolled leaves of grey poplar at Northwood, but the perfect insect is not often met with there. August and September.

Pædisca solandriana, Linn.; Wilk.; Staint. (*Epiblema solandriana*, Mey.).—Larvæ often abundant in rolled leaves of birch, and the moth is common in July and August. Northwood and Chalfont.

Ephippiphora similana, Hübn. (*Halonota bimaculana*, Wilk.; Staint. *Epiblema similana*, Mey.).—A few specimens obtained each year at Northwood, but the species seems to be very local, and has only been observed in August and September.

Ephippiphora pflugiana, Haw. (*Halonota scutulana*, Wilk.; Staint. *Epiblema pflugiana*, Mey.).—At Northwood and Mill Hill among thistles growing in damp places; not very common in the perfect state, but larvæ are fairly plentiful in the thistle-stems in the winter.

Ephippiphora brunnichiana, Fröl. (*Halonota brunnichiana*, Wilk.; Staint. *Epiblema brunnichiana*).—Found wherever coltsfoot is established. Very pale examples have sometimes been met with at Northwood.

Ephippiphora nigricostana, Haw.; Wilk.; Staint. (*Eucosma nigricostana*, Mey.).—Occurs at Kingsbury, Mill Hill, Harrow, and Northwood. The moth is not often seen, but larvæ and pupæ may be freely obtained by collecting old stems of *Stachys sylvatica* during the spring.

Ephippiphora trigeminana, St. (*Halonota trigeminana*, Wilk.; Staint. *Epiblema trigeminana*, Mey.).—Has been met with now and again at Kingsbury, Harrow, and Mill Hill, but the species does not appear to be common at either place.

Ephippiphora tetragonana, St. (*Halonota tetragonana*, Wilk.; Staint. *Notocelia tetragonana*, Mey.). — A few examples were captured at Mill Hill in 1877.

Semasia ianthinana, Dup.; Wilk.; Staint. (*Laspeyresia ianthinana*, Mey.).—This species was very common in 1887 at Kingsbury. The moths were flying in the late afternoon towards the end of July over a high hawthorn hedge.

Semasia wœberiana, Schiff.; Wilk.; Staint. (*Enarmonia *wœberiana*, Mey.).—Not uncommon in some gardens at St. John's Wood, Kingsbury, Hampstead, and Mill Hill.

Coccyx ochsenheimeriana, Zell. (*Pammene ochsenheimeriana*, Mey.).—Northwood. One specimen in May, and one in June, 1893; and three examples in May, 1894 (*vide* Entom. xxvii. 242).

Coccyx strobilella, Linn. (*Asthenia strobilella*, Wilk.; Staint. *Cydia strobilella*, Mey.).—Frequently reared from spruce cones obtained at Chalfont.

Coccyx splendidulana, Guen. (*Asthenia splendidulana*, Wilk.; Staint. *Pammene splendidulana*, Mey.).—Occurs at Kingsbury and Mill Hill, and is sometimes very common. May be jarred from oak trees.

Coccyx argyrana, Hübn. (*Ephippiphora argyrana*, Wilk.; Staint. *Pammene argyrana*, Mey.).—Usually common on oak trunks in most localities. April and May, sometimes as early as the last week in March.

Coccyx tædella, Clerck. (*Coccyx hyrciniana*, Wilk.; Staint. *Epiblema tædella*, Mey.).—Very common among spruce firs at Northwood. Some of the specimens are dark unicolorous, others are very pale in colour. By tapping the fir boughs the moths may sometimes be disturbed and netted by dozens at a time, and fine variable series obtained. May.

Coccyx nanana, Tr. (*Semasia nanana*, Wilk.; Staint. *Enarmonia nanana*, Mey.).—Occurs among spruce firs at Mill Hill, but seemingly not at Northwood. It flies in the late afternoon, and may be obtained by jarring the boughs. June.

Retinia buoliana, Schiff.; Wilk.; Staint. *Evetria buoliana*, Mey.).—Once at Mill Hill.

Carpocapsa pomonella, Linn.; Wilk.; Staint.; Mey.—The perfect insect flies around apple trees, and seems to be generally distributed. Larvæ common in apples in the autumn.

Carpocapsa splendidana, Hübn. (*C. splendana*, Wilk.; Staint.; Mey.).—Larvæ in acorns at Mill Hill, Kingsbury, Harrow, Pinner, and Northwood; sometimes common. Imagines may be beaten from hedges under oaks, and also netted as they fly around the branches at dusk. July and August.

Opadia funebrana, Tr. (*Carpocapsa funebrana*, Wilk.; Staint. *Epinotia funebrana*, Mey.).—The larvæ were very common in damsons some years at Mill Hill, but I only once succeeded in rearing the moth, and on that occasion only one example. Specimens have been netted once at Northwood and once at Rickmansworth; in each instance the moth was flying along a hedgerow in which blackthorn grew, and both examples were in poor condition.

STIGMONOTA INTERNANA, Guen.; Wilk.; Staint. (*Laspeyresia internana*, Mey.).—Common among furze at Northwood. Occurs in May and June, and flies in the afternoon in company with *Catoptria ulicetana*, from which species the males may be detected by their whiter hind wings. The females are more readily obtained by beating the furze over the open net, and then examining the latter.

STIGMONOTA REGIANA, Zell. (*Ephippiphora regiana*, Wilk.; Staint. *Pammene regiana*, Mey.).—Not rare in St. John's Wood and Regent's Park. The moth is most often found in the morning sitting on walls or palings under or near sycamore trees. June and July.

STIGMONOTA GERMARANA, Hübn. (*Endopisa germarana*, Wilk.; Staint. *Pammene germarana*, Mey.).—A few examples of the perfect insect have been taken at Mill Hill and Northwood. The larva feeds in rose-hips, and I have found the species in this stage in Epping Forest and elsewhere, but so far not in Middlesex or any other part of the area under consideration.

DICRORAMPHA POLITANA, Hübn.; Wilk.; Staint.—Often common among yarrow near the Midland station, Mill Hill; also occurs at Northwood and Rickmansworth. June.

DICRORAMPHA SEQUANA, Hübn.; Wilk.; Staint. (*Hemimene sequana*, Mey.).—Fairly plentiful among yarrow at Mill Hill; it occurs also at Kingsbury, Harrow, and Northwood. June.

DICRORAMPHA PETIVERELLA, Linn.; Wilk.; Staint. (*Hemimene petiverella*, Mey.).—Abundant among yarrow almost everywhere throughout the area.

DICRORAMPHA PLUMBAGANA, Tr.; Wilk.; Staint. (*Hemimene plumbagana*, Mey.).—Common in meadows at Mill Hill and Northwood in May and June.

CATOPTRIA ALBERSANA, Hübn. (*Grapholita albersana*, Wilk.; Staint. *Epinotia albersana*, Mey.).—Occurs sparingly in May and June at Northwood. The larva feeds in the autumn in folded leaves of honeysuckle, and the moth flies towards evening. I have not succeeded in finding the larvæ at Northwood, possibly because the food-plant there grows in tangled masses and is much mixed with briars, bramble, and hawthorn.

CATOPTRIA ULICETATA, Haw. (*Grapholita ulicetana*, Wilk.; Staint. *Laspeyresia ulicetana*, Mey.). — Common everywhere among furze.

CATOPTRIA CANA, Haw. (*C. scopoliana*, Walk.; Staint. *Epiblema cana*, Mey.).—Kingsbury, Northwood, and Chalfont. July.

CATOPTRIA HYPERICANA, Hübn. (*Grapholita hypericana*, Wilk.; Staint. (*Epinotia hypericana*, Mey.). Chalfont, not common; occurs among St. John's wort in July.

CHOREUTES MYLLERANA, Fabr.; Mey. (*C. scintillulana*, Staint.).—I obtained a dozen examples of this species at honeydew on sallows at Northwood in 1892, but I have not seen it there since.

SYMÆTHIS OXYACANTHELLA, Linn. (*S. fabriciana*, Staint.; Mey.).—Occurs in all hedgerows, and is on the wing throughout the summer.

EUPŒCILIA DUBITANA, Hübn.; Wilk.; Staint. (*Phalonia dubitana*, Mey.).—Used to occur plentifully some six or seven years ago in a field alongside the Finchley Road, about half way between the North London Railway and Cricklewood. The ground was to be built on, but I believe that operations have not been begun yet, so that probably the insect may still be found there.

EUPŒCILIA MACULOSANA, Haw.; Wilk.; Staint.; Mey.—I have only observed this species at Northwood, and it does not occur very commonly there.

EUPŒCILIA AMANDANA, H.-S. (*E. sodaliana*, Wilk.; Staint. (*Commophila amandana*, Mey.).—Occurs at Kingsbury along the Brent where buckthorn is found.

XANTHOSETIA ZOEGANA, Linn.; Wilk.; Staint. (*Euxanthis zoegana*, Mey.).—Only taken at Northwood along the railway embankment.

XANTHOSETIA HAMANA, Linn.; Wilk.; Staint. (*Euxanthis hamana*, Mey.)—Occurs at Northwood, Rickmansworth, Chorley Wood, and Chalfont.

ARGYROLEPIA HARTMANNIANA, Clerck. (*A. baumanniana*, Wilk.; Staint. *Chlidonia baumanniana*, Mey.).—A few specimens have been taken each year at Northwood. The species occurs among rushes.

ARGYROLEPIA BADIANA, Hübn.; Wilk.; Staint. (*Phalonia badiana*, Mey.).—Only at Chalfont. Imago in August. Among burdock.

CONCHYLIS SMEATHMANNIANA, Fabr. (*Lozopera smeathmanniana*, Wilk.; Staint. *Phalonia smeathmanniana*, Mey.).—Only taken on two occasions, once at Mill Hill and once at Northwood; several specimens, however, were secured at each locality. The species in flying keeps close to the herbage.

CONCHYLIS STRAMINEA, Haw. (*Lozopera straminea*, Wilk.; Staint.). *Euxanthis straminea*, Mey.).—Only obtained at Chalfont.

TORTRICODES HYEMANA, Hübn.; Staint. (*Cheimatophila tortricella*, Mey.).—Only met with at Northwood, but no doubt generally distributed throughout the area.

RICHARD SOUTH.

NOTES AND OBSERVATIONS.

Proposed Handbook of British Odonata. — We are very pleased to learn that Mr. L. Upcott Gill, the well-known publisher in the Strand, has conceived the idea of producing an illustrated Handbook to the British Dragonflies, and that he will immediately carry this out, if the small number of two hundred persons enter their names as subscribers at the modest sum of half a guinea. When it is understood that Mr. W. J. Lucas, with whose work on this group readers of the 'Entomologist' are familiar, is to write the book, we feel assured the project will not be allowed to fall through for lack of support. According to the prospectus before us, "it is proposed that the work shall contain beautifully coloured plates of the British Dragonflies, typical drawings in black-and-white of the eggs and nymphs, and structural figures of a very large number of microscopic and other details necessary for the careful study of the group, as well as certain other illustrations for the further elucidation of descriptive matter in the text. The plates are to be prepared from the author's drawings direct from nature, and therefore as to their accuracy there can be no question."

The rapid sequence in the publication of works on more or less neglected groups and orders of British insects, each written by an authority on the special subject dealt with, may be regarded as a sign of progress, indicating as it seems to do that there is a demand for such works, and consequently that the number of students of those groups has increased. The wider interest of British entomologists in the insect fauna of their own country is not the least remarkable of the many noteworthy entomological events of the end of the nineteenth century. So recently as twenty years ago, not very much attention was given to anything outside Lepidoptera, and even in this order only native productions were greatly in favour. The student of to-day finds that the limited lepidopterous fauna of the British Islands does not afford all the material he requires to enable him to attain a full knowledge of his subject. He, therefore, either seeks the assistance of his *confrères* abroad, or himself visits foreign lands in quest of specimens and information. Then, again, there are many entomologists in this country who having completed, or almost completed, their collections of butterflies and moths, take up the study of other orders, and in adding species after species to the new collection renew the pleasure they experienced when forming their series of Lepidoptera. Trustworthy handbooks, well illustrated, should be a distinct boon to the class last referred to, and no doubt they often induce a worker in a new field to continue when he feels upon the point of giving up.

South-eastern Union of Scientific Societies.—The third Annual Congress of the Union will be held in the Town Hall, Croydon, on June 2nd, 3rd, and 4th, under the presidency of the Rev. T. R. R. Stebbing, M.A., F.R.S. Among the papers to be read on June 3rd is one by Mr. J. W. Tutt, entitled "Entomology as a Scientific Pursuit"; this will be given during the morning meeting, 11 a.m. to 1 p.m. In the evening of the same date Mr. Fred. Enock will present the "Life-history of the Tiger-beetle," with lantern illustrations. Further particulars may be obtained on application to the hon. local secretary, Dr. C. Poulett Harris, 75, Morland Road, Croydon.

Exhibition.—The fourth Annual Exhibition of the Nonpareil Entomological and Natural History Society was held on April 20th and 21st last, and appears from the report, with which the hon. secretary has kindly furnished us, to have been very successful, both as regards objects and attendance.

Note on the Life-history of Forficula auricularia.—On April 2nd, 1896, in a rotten tree-stump in the fir-woods near Oxshott, I came across a female of the common earwig (*Forficula auricularia*) with a batch of pale yellowish-green eggs, which were of quite a considerable size for so small an insect. The earwig, with a few of the eggs and some of the rotten wood, were placed in a small glass-topped box. In this confined prison the mother carefully collected the eggs and placed them in a heap under the wood. If they were moved, or by moving the box were brought into the light, she carried them under cover, carefully lifting them with her jaws. So far the observations of De Geer were confirmed; but after the young appeared, which appearance took place in two or three days, she did not appear to me to pay much attention to them, though certainly I did not observe them so often as I might have done, or keep them in very natural conditions. Soon after hatching, the young were colourless and almost transparent, their heads being large, and their antennæ and forceps of inordinate length; the wings and wing-cases were, of course, quite wanting. The young soon became darker. Changes of skin occurred, but I cannot say how many times, and by towards the end of July the single survivor, a female, seemed to be mature. She was small, probably through being brought up under unnatural conditions, and not getting fresh food with regularity. They were usually fed on fruit, and I noticed on one occasion that they ate greedily of banana, antennæ and palpi moving incessantly the while.—W. J. Lucas.

Spring Appearance of Asteroscopus sphinx.—It may be interesting to again record the winter survival of *Asteroscopus sphinx*. This spring the males of this species have been taken in small numbers in the moth-trap of the Hon. R. E. Dillon, at Clonbrook, Co. Galway, where the moth is so abundant in November. Those captured in March seem to be somewhat darker in tint than the bulk of the autumnal specimens. The only reference to its reappearance in the early months of the year that I know of is to be found in Hofmann's 'Raupen der Schmetterlinge Europas,' p. 123.—Wm. Fras. de V. Kane.

Tæniocampa gracilis in Perthshire.—Mr. W. Reid ('Annals of Scottish Natural History,' April, p. 119) states that *T. gracilis* is "curiously uncertain in its appearance, being more abundant every alternate season." In the year 1897, for instance, he only saw three examples of the species, whereas in the previous year it was so abundant that he secured over three hundred specimens, and another collector took two hundred more. The variation of *T. gracilis* in Scotland seems to be similar to that exhibited in Irish specimens, as referred to by Mr. de Vismes Kane in his remarks on the species (Entom. xxviii. 253).

Acherontia atropos in Renfrewshire.—In a note on this species in the April part of 'Annals of Scottish Natural History,' the writer, Mr. M. B. Taylor, says, "A very remarkable instance of the larvæ occurring in great abundance was on a farm near Port Glasgow, Renfrewshire. In this case they were obtained in potato-pits, and the farmer said he could have got barrowfuls of them, they were in such abundance." It would be interesting to know in what particular year this extraordinary host of *A. atropos* larvæ was noted, and also to learn what object the said larvæ may be supposed to have had in congregating in the potato-pits.

Note on Aulax glechoma.—As there seems to be some difficulty in obtaining perfect specimens of *Aulax glechoma*, an account of the way I obtained two may be of some use to collectors of the Cynipidæ. I took the galls on June 9th, 1897, from the back of Box Hill, where ground-ivy is plentiful, kept the plants in water for a day or two; afterwards they were allowed to be quite dry, and were then placed in a room where there was a fire once and sometimes twice a week, until March 19th, when I cut open one of the large galls. I only had three. I found the insect was fully developed, but barely alive, so I put it in a little box near the fire, and in a short time it was quite lively and the wings stiff. A week afterwards I cut open the other two; the first contained several galls with dead insects, and the other but one, which was alive, like the one in the first gall. One of these specimens is in our National Museum at South Kensington, and the only British representative in the collection. The smaller galls contained dead but fully developed insects.—F. Milton; 7, Chilton Street, Bethnal Green, E., May 12th, 1898.

Platyptilia tesseradactyla, Linn.—This species, which was recently recorded from Ireland by Mr. Barrett (Ent. Mo. Mag. xxxiii. 25, and Entom. xxx. 74), is, according to Dr. Fernald (Pteroph. North Amer. p. 32), found in Massachusetts. In the monograph cited the food-plants of the larva are stated to be *Gnaphalium dioicum* and *G. arenarium*, and the following note on the life-history is given:—"The egg is pale green, smooth and somewhat elongated, and the larva in its earliest stage is clear white, with isolated hairs. Head, thoracic and anal shields black. Later (in September) the dorsal and lateral rows of rust-brown points appear; and in March, after hybernating, it becomes stout without increasing very much in length. The head, thoracic and anal shields are dark brown; dorsal stripe is crimson-rust colour; the subdorsal and lateral lines are of the same colour but finer. The ground colour of the body is yellowish above and rust-red beneath. The adult larva is a little smaller at each end and cylindrical in the middle. The head is small and black, the thoracic shields small, black, divided by a light line. The colour of the body is dark ferruginous brown. On the back stand whitish flecks, with two pairs of black tubercles on each segment, of which the hinder are placed farther from each other than those in front; similar tubercles occur on the sides, from which arise long light hairs. The anal shield and legs are dark brown. These larvæ frequently vary in the tone of the colour (Gartner)."

The Rhopalocera of the Wye Valley.—The following is a list of the Diurni I have observed in the Wye valley, seven miles below Builth, and within a radius of five or six miles from Erwood Station, Cambrian Railway. The geological formation is Silurian and Old Red Sandstone, and the country is well wooded.

Argynnis paphia. Fairly common.—*A. aglaia*. A few occur every year, but it is far from common.—*A. adippe*. Much the commonest of the three larger fritillaries. All three occur more commonly than anywhere else in the district, in a sloping ferny wood near the waterfall of Graig-y-pwl-ddhw.—*A. euphrosyne*. Common everywhere. One season a few years ago they swarmed and were unusually large and in fine condition.—*A. selene*. Fairly common.

Melitæa artemis. Very rare. I have only seen it in the corner of one meadow, and that was some years ago.

Grapta c-album. Occurs every year in fair numbers, both in the autumn and in spring, after hybernation.

Vanessa urticæ. Our commonest butterfly; I have seen it flying in the sunshine in almost every month of the year. It seems to sooner awake from its winter sleep on a fine sunny mild day than any other kind.—*V. antiopa*. I once saw some years ago a specimen of this beautiful insect at rest on a flower on the railway embankment near Abererch station. I was quite close, and am perfectly certain what it was. Unfortunately I had no net, and was unable to capture it.—*V. io*. Not very common.

Pyrameis atalanta. Commoner than the preceding.—*P. cardui*. Very uncertain; some years plentiful and then hardly a specimen is seen for two or three seasons. It has been very scarce lately.

Pararge megæra. Plentiful and fine.

Satyrus semele. Rare.

Epinephele ianira. Very abundant. I once took a female whose under wings were perfectly white, as if bleached.—*E. tithonus*. Plentiful.—*E. hyperanthes*. Only occurs in one wood, and sparingly there.

Cœnonympha pamphilus. Very abundant.

Thecla quercus. Very rare, except in the Jubilee year, 1887, when they fairly swarmed round the top of some oak-trees in the wood near Craig-y-pwl-ddhw. They flew so high it was difficult to take them, but by tying my net to the bottom joint of a salmon-rod I got a nice series.—*T. w-album*. I have twice taken this insect.

Polyommatus phlœas. Common. A few years ago it seemed to be getting scarce, but of late it has been numerous again.

Lycæna icarus. Very abundant.—*L. argiolus*. Common about holly-trees in spring.

Colias edusa. Is seldom seen, but in years in which it is plentiful in England a few specimens generally come our way.

Rhodocera rhamni. Very rare.

Anthocharis cardamines. Very abundant, and varies greatly in size. I have taken some very small specimens.

Pieris rapæ. Abundant.—*P. napi*. Common.—*P. brassicæ*. Not common, and seems to be getting rarer every year.

Hesperia tages. Common.—*H. linea*. Fairly plentiful.—J. W. Vaughan; The Skreen, Erwood, R.S.O., Radnorshire, May 14th, 1898.

NOTE ON THE DURATION OF THE LARVAL STAGE OF TAPINOSTOLA BONDII, Knaggs (MORRISII, Tutt, *nec* Morris, *nec* Dale).—With regard to this species, Mr. Meyrick's 'Handbook' says: "Larva on *Festuca arundinacea*, 8;" meaning thereby that the larva in its final stage (see Introduction, p. 16) may be found *on* that plant in the month of August. My own impression is that this larva is an internal feeder; that the majority of the ova do not hatch till August; and that the final stage is not reached till ten months later on, namely, from the end of the present month, May, to the end of June, or even later. However that may be, it is now the season to put the matter to the proof, and I have therefore thought the present a fitting occasion to bring the subject before the entomological public. I believe that the collectors will have little difficulty in finding the larvæ, together with those of *M. furuncula*, at the bases of the flower-stems of the grass. In July, plenty of imagines may be taken, from which ova may be secured, and in August the collector may watch the hatching of the ova and the delicate little larvæ with their long silken hairs, which they soon lose, as they at once proceed to mine down the sheath of the grass.—H. G. KNAGGS; Folkestone, May, 1898.

LEPIDOPTERA FROM THE MEDITERRANEAN: ADDITIONS AND CORRECTIONS. The following errors occur in my "Notes," *ante*, pp. 108–116:—P. 109, line 14 from bottom, for "wrist" read "waist." P. 110, erase "larvæ on fennel" after "*Papilio podalirius*." P. 111, erase "both" before "common" after "*Pieris daplidice*." P. 112, line 10 from bottom, after "*Pararge*" read "*egeria* var. *egerides*," instead of "*egeria* and *egerides*."

Diloba cæruleocephala. This species was accidentally omitted from the Malta list. The larvæ are extremely abundant during March and April, and do an immense amount of injury to almond and peach-trees, some of which I noticed were entirely stripped of their leaves.—GERVASE F. MATHEW; H.M.S. 'Hawke,' Malta, May 10th, 1898.

CEROPLASTES CISTUDIFORMIS AGAIN.—I stated, *ante*, p. 119, that this scale had only been found in Mexico by Dr. Dugis, at Guanajuato. Since that was written, Dr. L. O. Howard has sent me three lots of it, collected by Prof. C. H. T. Townsend at Tampico, Mexico, early in 1897. One lot is from *Cordia boissieri*, A. DC., one from Avocado pear, and the third from a thorny tree not determined.—T. D. A. COCKERELL.

CAPTURES AND FIELD REPORTS.

LEPIDOPTERA FROM NORTHERN AND SOUTHERN EUROPE.—In connection with the increasing attention given to continental insects, the following items may probably be of interest to readers of the 'Entomologist.' A friend of mine, visiting San Remo last year in the months of March and May, very kindly caught for me the following butterflies:—*Papilio podalirius*, three specimens, one taken March 19th, and two on May 8th. *P. machaon*, three, March 12th, March 20th, and May 9th. *Leucophasia sinapis*, one on March 20th. *Euchloë belia*, five, March 19th and May 8th. *Colias edusa*, three, March 16th and 20th. *Pararge egeria*, one, March 19th. *Lycæna* *baton*, Berg. (the *hylas* of Hübner and *hylus* of Fabricius), four specimens taken March 20th. *E. belia* might easily be mistaken for our *E. cardamines*, in spite of the entire absence of the orange tip even in the males. Yet, to my mind, it is a handsomer butterfly. The upper-wing tips are broadly black, and contain three white spots, the apical one being larger than the other two below it, and there is a very large black spot, boot-shaped, but with the heel cut off, in the male, and rectangular in the female. The under sides of the fore wings are tipped with green and spotted with silvery white, while the lower ones are wholly green and similarly spotted. The specimen of *P. egeria* is a typical one, and contrasts strongly with a series I have from Co. Waterford, the ground colour of which is nearly black, and the spots the palest of buff, nearly white. My friend also sent me a number of the larvæ—noted for their stinging hairs—of the "processionary moth" (*Cnethocampa processionea*, I think), which he found feeding upon the pines. They could not acclimatise themselves, although I kept them indoors, and they all died, chiefly after spinning up.

Another friend, Mr. J. Lyon Denson, of Chester, had a bicycle ride, in mid August, through Southern Norway. "It had been," he writes, "hot and without rain for five weeks before I arrived. The first few days were fine, and plenty of mosquitos were biting. The remainder of my time was cooler and showery, so I was not troubled with the mosquitos further. Riding between Heen and Sorum, I came across scores of *Vanessa antiopa* in splendid condition. They were flying chiefly in the glades of the pine forest, and, notwithstanding my most energetic efforts, I failed to secure a single specimen, so extremely quick were they, and so ill provided was I, with only my little cycling cap. I offered half a kroner to a skydsgut who was driving a carriole with luggage, if he would help me with his big felt hat; but he shook his head and replied, in broken English, 'No; it is not good to catch them;' and I afterwards came to the same conclusion, as I nearly lost my camera through leaving it behind after a long chase. On another occasion, seeing a splendid specimen on something dark in the road, fanning its wings in the bright sunshine, I carefully made a swoop on it with my cap, but, alas! the insect soared away with the utmost indifference, and I found that I had got only a dead frog! *Polyommatus phlæas*, *Lycæna alexis*, *Epinephele ianira*, and 'skippers' were common. The 'whites' were badly worn. I noticed a number of *Vanessa urticæ*, *Gonopteryx rhamni*, fritillaries like the one sent (*Argynnis latona*, and *V. atalanta*. Hundreds of dragonflies, big fellows, were sailing about in all directions. All these I noted nearly all the way from Christiania to Bergen. At Oilo I beat the moth (it looks like a very rubbed *Abraxas grossulariata*) out of some birch bushes, where I came across a large colony of the hill ant, near the river, consisting of upwards of a hundred mounds, varying from one to two feet in height, and all teeming with life."—J. Arkle; Chester.

Early Appearance of Syrichthus alveolus.—In spite of the warm winter, everything in this neighbourhood is backward; but to my surprise on April 27th I took a freshly emerged grizzled skipper in a clearing in the woods bounding the old race-course. Two days later numbers were out flying about in the same place. Its usual time of appearance here is the latter half of May. Several specimens were extremely light in colour.—F. V. Theobald; Wye Court, Wye, Kent, May 7th, 1898.

Abundance of Crepidodera rufipes.— On April 13th I received from Maplescombe, Farningham, a boxful of the pretty flea-beetle (*Crepidodera rufipes*). This insect was swarming in some fields of tares. One field of five acres was half cleared off by them. The sufferer from this attack, Mr. Rogers, wrote me that the beetles were so thick up the rows as to make them look black. They were extremely active, and I found would not eat cruciferous plants given them; *Vicia* and *Orobus* seem the favourite food. The tares that were destroyed were on an old sainfoin ley.—F. V. Theobald.

Nyssia hispidaria.—I see you note (*ante*, p. 120) the capture of *N. hispidaria* on March 28th in Surrey. I took five specimens here last year on Feb. 10th, and two more a day or two later.—F. D. Bland; Major 3rd York & Lanc. Reg., Llanrwst, N. Wales.

Rhopalocera in North Wales.—Within the last few days butterflies have been most abundant in this part of the Vale of Conway. On the road between Gwydyr Castle and Bettws-y-Coed, *Lycæna argiolus* has been out in swarms, but it has been plentiful for the last ten days. On Saturday *Euchloë cardamines* was everywhere on the wing, and I saw *Vanessa urticæ* (common), *V. io*, *V. atalanta*, *Pieris rapæ*, and one *V. c-album*.—F. D. Bland; May 10th, 1898.

Field Meeting of the South London Entomological and Natural History Society.—Oxshott was again visited by members of the above Society on May 21st. Although the weather at 2.17 p.m., the time arranged for the departure from Waterloo, was not exactly promising for a country ramble, the conductors, Major Ficklin and Mr. Lucas, found, on the arrival of the train at Oxshott station, that they had a party of over a dozen to take charge of, and this number was shortly afterwards increased by two members who travelled down by a later train. Having regard to the appearance of the sky, which seemed to threaten a heavy fall of rain before long, a start was made for the pine-clad ground towards Esher, and ultimately the party arrived at the Black Pond, by which time the ominous clouds had passed away, giving place to brilliant sunshine, and this improved condition of meteorological affairs was maintained for the remainder of the afternoon. During the walk among the pines, and subsequently through the woods beyond, the entomologists of the party gave the tree-trunks very careful attention, but insects were only observed upon them at rare intervals, and those members who searched or beat for larvæ did not meet with much greater success. On returning to the cottage near the station, where tea was provided, it was ascertained that during the four hours' ramble the lepidopterists had only secured about thirty species, and the coleopterists about twenty species; those interested in other orders of insects also reported a great dearth of specimens and species. However, considering the kind of weather that had prevailed throughout the month up to the date of the visit, no one appeared to be disappointed at not meeting with better sport, but, on the contrary, the general feeling was that the afternoon had been a very pleasant one. The following is a list of the species taken or observed:—

Coleoptera.—*Nebria brevicollis*, *Necrophorus mortuorum*, *Mysia oblongoguttata*, *Anatis ocellata*, *Halyzia* 18-*guttata*, *Coccidula rufa*, *Dolopius marginatus*. *Donacia sericea*, *Lochmea suturalis*, *Anaspis geoffroyi*, *Rhynchites æquatus*, *Strophosmus coryli*, *S. lateralis*, and a few small beetles not yet identified.

Lepidoptera.—*Gonopteryx rhamni* (ova), *Drepana falcataria*, *Panolis piniperda*, *Ellopia prosapiaria* (lar.), *Odontopera bidentata*, *Tephrosia biundularia*, *T. punctularia*, *Pseudoterpna pruinata* (lar.), *Geometra papilionaria* (lar.), *Zonosoma pendularia*, *Scodiona belgiaria*, *Ematurga atomaria*, *Bupalus piniaria*, *Cheimatobia brumata* (lar.), *Oporabia dilutata* (lar.), *Larentia viridaria*, *Eupithecia nanata*, *E. indigata*. *E. pumilata* (lar.), *Thera variata*, *Coremia designata*, *Scoparia ambigualis*, *Catoptria ulicetana*, *Talæporia pseudobombycella* (case), *Fumea intermediella* (case), *Incurvaria muscalella*, *Adela viridella*, *Gelechia ericetella*, *Coleophora vibicella* (case), *C. ibipenella* (case).

Neuroptera.—*Libellula quadrimaculata*, *Agrion puella*, *A. cyathigerum*, *Pyrrhosoma minium*, *Raphidia* sp., *Hemerobius micans*, *H. nitidulus*, *H. limbatus*. A species of *Nemoura* and two species belonging to the Trichoptera were not determined.

Rhopalocera in South Wales.—I have seen many specimens of *Pieris brassicæ* during the last ten days. It has been generally scarce here since 1894, when from some cause it almost disappeared. A great deal of rain has fallen during this month (May), and on several occasions the temperature has been low, so that I think Lepidoptera are later than in some seasons. *Lycæna icarus* is only just appearing, but *Polyommatus phlæas* and *Argynnis euphrosyne* have been out a little time in warm and sheltered localities. — T. B. Jefferys; Laugharne Carmarthenshire, May 28th, 1898.

Papilio machaon at Hornsey.—On Sept. 25th, 1897, I saw two specimens of *P. machaon* on Muswell Hill. They were together, and as far as could be seen in good condition Not having a net with me at the time, I could not even try to capture them. Four and a half years ago I saw one in Middle Lane, Hornsey; since then I had not seen it until Sept. 25th. I understand that in years gone by this species was not uncommon in this locality.—Linden Heitland; Amberley House, Crouch Hill, N., Feb. 8th.

[Probably escaped from, or set at liberty by, someone residing in the neighbourhood.—Ed.]

SOCIETIES.

Entomological Society of London. — *May 4th*, 1898. — Mr. R. Trimen, F.R.S., President, in the chair. Mr. H. G. Palliser, of 6, Mount Park Road, Ealing, W., was elected a Fellow of the Society. Colonel Yerbury exhibited a series of Diptera collected at Hyères during March and April, 1898, and including *Brachypalpus valgus*, Panz., *Callicera fagesii*, Guér., and a species of *Platystoma* which appeared to be undescribed. Mr. Barrett showed aberrant forms of British species of Lepidoptera from Gloucestershire and Warwickshire. Mr. Waterhouse exhibited two burnished golden beetles, *Anoplognathus aureus*, from Queensland, and *Plusiotis resplendens* from Panama, which he stated to be interesting examples of a similar result being attained by a process of natural selection in two species of the same family in widely separated localities. Many members of the family had a slight tendency to show metallic colours. It would be interesting to ascertain whether there were any similarity in their surroundings in the two countries which would make this golden appearance an advantage, or whether it might be considered a "warning colour." Allied species, however, appeared to be edible. Mr. Walker exhibited specimens of the rare *Philonthus fuscus*, Grav., found in a *Cossus*-eaten poplar in Chatham Dockyard at the end of April. Mr. R. McLachlan communicated a paper on "Neuroptera-Planipennia belonging to the families Osmylidæ, Hemerobiidæ and Chrysopidæ, taken by the Rev. A. E. Eaton in Algeria."—W. F. H. BLANDFORD, *Hon. Sec.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*March* 24*th*, 1898.—Mr. J. W. Tutt, F.E.S., President, in the chair. Mr. Adkin exhibited specimens of *Grammesia trigrammica* (*trilinea*) in which the ground colour was so darkened as to obliterate the usual transverse lines. These were known as the Lewis form. Mr. Moore, a pale pigmented variety of *Anosia menippe* (*archippus*) from the Malay Archipelago. It was noted that such a variation of this species was hitherto unknown. Mr. Cant, a series of strongly-marked specimens of *Hybernia defoliaria* from Dean Forest, and a dark costal form specimen of *Xylocampa conspicillaris* from Worcester.

April 14*th*.—Mr. R. Adkin, F.E.S., Vice-President, in the chair. Mr. Harrison exhibited a number of living specimens of a coleopteron from Bombay. It was a species of the *Cassida* group, and looked like a piece of pure gold. It was stated that this appearance was lost after death. Mr. South exhibited hybernated specimens of *Peronea ferrugana* and *Cerostoma radiatella* from Oxshott, where they were obtained this spring; also, on behalf the Rev. A. Snell, a curious specimen of *Leucania littoralis* with dark hind wings and fringes to fore wings. Mr. Ashby, specimens of the spring-tail, *Machilis polypoda*, taken under wood and stone in the New Forest. Mr. Adkin, various specimens of the Tephrosias. Mr. South, a number of Japanese Lepidoptera, kindly lent by Mr. Leech to illustrate his (Mr. South's) paper entitled "British Species of Lepidoptera occurring in Japan."

April 28*th*.—Mr. R. Adkin, F.E.S., Vice-President, in the chair. Mr. Bishop exhibited a varied series of bred *Tæniocampa miniosa*, and remarked that a large proportion of the specimens had the claws of the front legs undeveloped, and were thus unable to cling to vertical surfaces. Mr. Sauzé, a series of *Brachinus crepitans* from Swanage, very variable in both size and colour. Mr. Edward Saunders sent a series of Hemiptera-Heteroptera, comprising examples of most of the genera of this group, to illustrate his paper. Mr. West (Greenwich), a large number of Hemiptera, taken by himself during the last three years. Mr. Adkin, a series of bred *Eugonia quercinaria*, including gynandromorphous specimens, together with mounted examples of the genitalia and enlarged photographs of the same, and read detailed notes. A paper communicated by Mr. Edward Saunders, F.L.S., entitled "Notes on Collecting British Hemiptera" was then read.

May 12*th*.—Mr. J. W. Tutt, F.E.S., President, in the chair. Mr. J. W. Downing, of Tooting Graveney, was elected a member. Mr. Adkin exhibited red specimens of *Cidaria unidentaria*, and Mr. Tutt said there was no doubt as to this form occurring in the species, as it had recently been bred. Mr. Moore, specimens of *Anasa tristis*, the squash-bug; *Murgantia histrionica*, the harlequin cabbage-bug; *Anophthalmus tenuis*, a blind cave-beetle; and *Blissus leucopterus*, the chinch-bug, all from the United States of North America; and contributed notes. The blind beetle was from the famous Wyandotte caves. Mr. Tutt, a specimen of *Libythea celtis*, taken in S. France after hybernation, and set to show the protective resting habit, the veins and markings of the lower side and the palpi and antennæ admirably resembling a dead but still attached leaf and its stalk. Mr. Jones, a very large number of European Lepidoptera, mostly bred and in the finest condition, to illustrate his paper on the subject of "Collecting in the Riviera." Mr. Tutt and Dr. Chapman gave details of their recent experiences in the district.—Hy. J. Turner, *Hon. Rep. Sec.*

Lancashire and Cheshire Entomological Society.—*May 9th*, 1898.—The President in the chair. Mr. F. R. Dixon Nuttall, F.M.S., was elected a member. Mr. F. M. Pierce, F.E.S., read a paper entitled "Recent Investigations of the hair-pencils on certain Noctuæ." After a short summary of the immense field of research open to entomologists, the lecturer proceeded to add to the width of that field by a description of the classificatory use of this hairy organ. Describing how he was led to a study of this subject by a specimen of *E. nigra*, he proceeded to point out the frequent occurrence of this organ in several—in fact, in most—of the species of Noctuina. The organs, briefly described, are a pair of chitinous flaps, one at each side of the ventral surface of the abdomen and close to its junction with the thorax. From each of these flaps proceeds a pencil of fine *hairs*, closely agglutinated at the base, separating towards the apical half, and then enclosed in a pocket further down the abdomen, and generally more towards the centre. He illustrated his paper by excellent diagrams and microscope slides. He contrasted these pencils with the tarsal tufts of the Herminidæ, pointing out that these are *hairs*, not *scales*, and are *joined* for a considerable distance, while each hair after separation is marked with a network of *rhombi*, each with a raised centre, not with pits and striations, as in the scale-tufts of Herminia. He proved these organs to be specific, not accidental, but disproved the suggestions as to their being respiratory organs and so on, as found in the writings of Inchbald, Matthews, Westwood, Kirby and Spence, and Allis. He also explained how these organs apparently have been overlooked in so many species, by the fact that they are, as a rule, enclosed in the above-mentioned pockets. He attributed to them some unknown sense, and gave a list of species proved to possess or to be without these organs. After an account of the different sizes and shapes they manifest, the lecture closed with a discussion. One of the points brought out in discussion was the possibility of these being scent-organs, not necessarily for receiving sense of scent, but for distributing the scent. The discussion also attempted to associate their absence with the presence of pectinated antennæ. Exhibits by Messrs. Capper, Pierce, Thompson, Cotton, Birch, Freeman, and Prince, closed the evening. The next meeting is to be devoted to exhibits only, and is to be held on Oct. 10th.—(Rev.) R. Freeman, M.A. *Reporting Sec.*

Birmingham Entomological Society.—*April* 18*th*, 1898.—Mr. R. C. Bradley in the chair. Mr. P. W. Abbott showed a very fine series of *Heliothis peltigera*, taken in South Devon last year. Mr. R. C. Bradley showed a small lot of insects collected during a holiday spent in Norway last year. He spent most of his time cruising in the fiords, &c., and was only able to collect a very little at times when on shore; amongst his captures were *Boarmia repandata* with pale blotches in the disc of the fore wings, and very fine varieties of *Bombus agrorum*. Mr. Martineau showed a fine large *Sirex gigas* (female), taken in a grocer's shop at Solihull.—Colbran J. Wainwright, *Hon. Sec.*

RECENT LITERATURE.

Revision of the Orthopteran Group Melanopli (Acridiidæ), with special reference to North American forms. By Samuel Hubbard Scudder. [From the 'Proceedings of the United States National Museum,' vol. xx. pp. 1–421 (with Plates i–xxvi.)] Washington: Government Printing Office. 1897.

Got up in the usual lavish style of the American State publications, and being illustrated by twenty-six well-executed plates, each containing numerous figures, this Revision cannot fail to satisfy and be useful to the student of a branch of the Orthoptera so numerously represented in North America. This group, in fact, forms the prevailing type of Orthopteran life throughout its area, and is almost confined to that continent. But one genus, *Podisma*, Latr. (*Pezotettix*, Burm.), is found in the old world, where, however, it is more abundantly represented than in the new; it encircles the globe north of the 35th parallel. The *Melanopli* are a part of the *Acridiidæ* (to which family the locusts of the East belong), of generally small or medium size, never very large. The best known representative, though luckily only by repute to dwellers outside America, is the "Rocky Mountain locust" (*Melanoplus spretus*), so destructive sometimes in the western half of the Mississippi valley.

W. J. L.

Gynandromorphous Macro-Lepidoptera of the Palæarctic Region, vol. ii. *On the Physiology of Hermaphrodite Macro-Lepidoptera.* Oskar Schulz.

The German notice of these books is a very favourable one. It appears that all the records of gynandromorphous species in the Palæarctic Region are tabulated in a convenient form for purposes of reference; while in the second book, concerning the structure of hermaphrodite forms, the characters of the genitalia are discussed.

W. M.

The Pterophoridæ of North America. By C. H. Fernald, A.M., Ph.D. Pp. 80, plates i–ix. Massachusetts Agricultural College. 1898.

Dr. Fernald considers that, with the removal of the genus *Chrysocorys* from the group, the *Pterophoridæ* should be placed in the vicinity of the Pyralids, and in this opinion he is probably in agreement with the majority of entomologists. We note that in very few instances is there any reference to the earlier stages of the species dealt with, and where particulars are given of the larva and pupa the majority of such details are taken from European, chiefly English, sources. It would seem then that since the publication in 1880 of '*Pterophoridæ* of California and Oregon' by Lord Walsingham, these interesting insects have not received, up to date, very much attention, at least not to the extent of elucidating their life-histories. The genera employed are as follows:—1. *Trichoptilus*, Wlsm., three species; 2. *Oxyptilus*, Zell., four species; 3. *Platyptilia*, Hübn., nineteen species, including *cosmodactyla*, Hübn., *acanthodactyla*, Hübn., *tesseradactyla*, Linn., and *marginidactylus*, Fitch = *bertrami*, Roessl.; 4. *Alucita*, Linn. (= *Aciptilia*, Auct.), three species; 5. *Pterophorus*, Geoff., twenty-five species, several of which are usually referred to *Lioptilus* (*Leioptilus*), Wallgr., and including *monodactylus*, Linn., which Walsingham places in *Pterophorus*, Wallgr., and Meyrick (Handb. Brit. Lep.) includes in *Alucita*, Linn.; 6. *Stenoptilia*, Hübn. (= *Mimeseoptilus*, Wallgr.), four species, one of which is *pterodactyla*, Linn.; 7. *Orneodes*, Latr. (= *Alucita*, Auct., nec. Linn.), one species, *hexadactyla*, Linn. The plates comprise figures of structural detail, chiefly of genitalia, and add considerable value to the work.

British Orthoptera (*Earwigs, Grasshoppers, and Crickets*). By Malcolm Burr, F.Z.S., F.E.S., &c. With six plates by S. L. Mosley, F.E.S. 8vo, 68 pp. Huddersfield: The Economic and Educational Museum. 1897.

Some of the species described and otherwise referred to in this handy little book are among the most common objects of the country, whilst others are included in the category of familiar household insects. Others again, and these by far the greater number, are probably almost, or quite, unknown to most people, whether interested in entomology or not. For this reason, therefore, Mr. Burr's contribution to our knowledge of British Orthoptera is exceedingly welcome, and will most certainly be obtained and duly appreciated by those who have been in ignorance, chiefly because they lacked the means of readily identifying the insects of this order when met with. The book before us will remove this difficulty, and we shall henceforth have but little trouble in determining any earwig, grasshopper, locust, or cricket that may present itself during our rambles through the open country or even in the course of our business pursuits elsewhere. The work bears undoubted evidence of having been most carefully prepared, consequently it is to be regretted that those responsible for it while passing through the press have allowed errors to creep in; apart from these blemishes, and as regards the text, we have nothing but praise. We wish we could say as much for the plates, but unfortunately they are not as satisfactory as they might be. It is certainly a mistake in works of this kind to give coloured plates unless they can be produced so as to show the tints proper to the insects represented. Well executed black and white figures are perhaps not so attractive in appearance, but they are much to be preferred to poorly coloured plates. On the whole, however, we believe that the book will supply a long felt want, and we heartily commend it.

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HYBRIDIZATION.

In 'Science Progress' for April there is an important paper by Dr. Dixey on "Recent Experiments in Hybridization conducted by Dr. Standfuss, of Zürich." Referring to fertile and infertile pairings between species of Lepidoptera, our author remarks that in five cases only male specimens resulted, whilst in five others only female examples were reared, and these latter "contained no eggs capable of development." Seven other crosses again produced both males and females, but the former were in the majority and the latter were sterile. After referring to still five other crosssings, he mentions that according to Standfuss "In no single instance has the female of any true hybrid among Lepidoptera been shown experimentally to be fertile." All who are studying the facts of hybridization will no doubt make a point of seeing this valuable contribution to the subject, but in the meanwhile we venture to give one or two extracts therefrom that will interest readers who rear the species mentioned.

"Aberrations.

"Some very remarkable facts are recorded as to the effect of crossing a sport or aberration with its parent form. The result, which is entirely different from that which follows the crossing of distinct species, or even of local races, may be broadly stated as follows: When an aberration is crossed with its parent form the issue is sharply divided, in both sexes, into specimens of the aberration and of the normal form of the species. Thus in the dark aberration *zatima*, Cr., of *Spilosoma lubricipeda*, Esp., there are many degrees from the least dark form of the aberration (ab. *intermedia*, Bang-Haas) up to the darkest (ab. *deschangei*, Depuis); but no transitional forms occur to bridge over the wide gap between *intermedia* and *lubricipeda*, nor can they be produced by crossing these two. 'It seems,' so Standfuss expresses it, 'as if there were antagonistic characters which cannot co-exist in the same individual.' Instances follow which will be briefly noticed here. For full details, which are of great interest, the the reader is referred to the 'Handbuch,' pp. 305–321.

"*Spilosoma lubricipeda*, Esp., ♂, and ditto var. *zatima*, Cr., ♀.—These, crossed by Burckhardt in 1889, gave *lubricipeda*, *intermedia* and *zatima* (*intermedia* being, as just stated, merely a less dark form of *zatima*). Two of these *intermedia* were paired, giving again *lubricipeda*, *intermedia* and *zatima*. In this third generation several pairings were effected, as follows: *zatima* ♂ and *lubricipeda* ♀; *lubricipeda* ♂ and *zatima* ♀; *intermedia* ♂ and ditto ♀; *intermedia* ♂ and *zatima* ♀. All these gave *lubricipeda*, *intermedia* and *zatima* in varying proportions, except the cross *lubricipeda* ♂ and *zatima* ♀, from which only *zatima* resulted. A pair of *lubricipeda* from this fourth generation gave a brood of thirty-four *lubricipeda* and one extreme *zatima*. In all these successive broods, carried on into the fourth year from the date of the original pairing, there were no transitional forms between *lubricipeda* and *intermedia*.

"*Grammesia trigrammica*, Hufn., ♂, and ditto ab. *bilinea*, Hb., ♀.—The female *bilinea*, taken by Gross at Garsten in Austria, laid eggs of which the male parent was presumably a normal *G. trigrammica*. Of the sixty-seven perfect insects that resulted thirty-eight were *trigrammica* and twenty-nine *bilinea*. There were no intermediates.

"*Angerona prunaria*, L., ♂, and ditto ab. *sordiata*, Fuessl., ♀.—This cross, procured by Zeller, gave seventeen *prunaria* and fourteen *sordiata*.

"*A. prunaria* ab. *sordiata* ♂, and *A. punaria* ♀.—This cross, also obtained by Zeller, gave eighty-four of *prunaria* to sixty-eight of *sordiata*, i.e. as in the reciprocal cross, about 55 per cent. of the type and 45 per cent. of the aberration. In neither of these cases were there any intermediates.

"*A. prunaria* ab. *sordiata* ♂ and ♀.—Among a large brood reared from the eggs of a pair of normal *A. prunaria*, there appeared three males and two females of the aberration *sordiata*. From a pair of these Standfuss obtained thirteen *prunaria* (three males and ten females) and forty-two *sordiata* (twenty-four males and eighteen females). Again there were no transitional forms.

"*Amphidasys betularia*, L., ♂, and ditto ab. *doubledayaria*, Mill., ♀. — A female *doubledayaria* found by Steinert near Dresden produced seventy-five *betularia* (thirty males and forty-five females) and ninety *doubledayaria* (thirty-four males and fifty-six females). The male parent was doubtless an ordinary *betularia*. Two of the examples classed as *betularia* were darker than the normal, but otherwise no transitional forms occurred. Standfuss is of opinion that even these two need not be regarded as owing their darker coloration to the cross, for it is well known that *A. betularia*, like *P. monacha*, is undergoing a gradually increasing melanism, which is probably protective, in many parts of its area of distribution. The extreme aberration *doubledayaria*, which thirty years ago was known only from Great Britain, has now appeared in Westphalia, the Rhine Provinces, Hanover, Gotha, and lastly in Dresden and Silesia. In several of these places it is becoming more and more common, and in at least some of them it is found side by side with the darkening forms of *A. betularia*, which, though of different nature and origin from the sport *doubledayaria*, are no doubt being preserved and brought up to its level (in aspect) under the influence of natural selection.

"*Boarmia repandata*, L., ♀, and ditto ab. *conversaria*, Hb., ♀. A large brood raised from the eggs of a pair of normal *B. repandata* contained three males and one female of the aberration *conversaria*. This female, which was paired with a wild male *B. repandata*, produced twenty-eight *repandata* (of which ten were males and eighteen females) and six *conversaria* (four being males and two females). The majority of the larvæ died during the winter. Here again intermediate forms were entirely absent.

"From the above experiments in the pairing of normal forms with aberrations and local races, performed or recorded by Standfuss, he arrives at the following conclusions:—

"1. *When the normal form of a species (Grundart) is crossed with a gradually formed local race of the same species, the result is a series of intermediate forms.*

"2. *When the normal form is crossed with a sporadic aberration, the result in many cases is that the issue divides itself sharply between the normal form and the sport, intermediate forms being absent.*

"Hence, according to Standfuss, the process of species-formation must be gradual; for when two distinct species are crossed, the issue does not split up into the two parental forms as in the case when one parent is a suddenly formed aberration. On the contrary, the behaviour of the issue of two distinct species is very similar in kind to that of a species crossed with a local race or variety which is being gradually established by the accumulation of slight changes. It would seem therefore that although an aberration or sport may be perpetuated by inheritance, it can never acquire distinct specific rank. No doubt, however, it may, if selected, eventually replace the original form of the species."

NEW SPECIES OF *SYNTOMIS* FROM CHINA.

By J. H. Leech B.A., F.L.S., &c.

Syntomis xanthoma, sp. n.

Frons yellow; tegulæ spotted with yellow at the base; head and thorax blackish, its posterior edge yellow; abdomen bluish black, with seven yellow bands. Antennæ black, white towards tip above. Primaries black with a purplish reflection, and six yellowish hyaline spots (one subbasal, one in the cell with a minute one below it; beyond the middle one towards costa, one towards inner margin, and one between them; the latter is intersected by vein four). Secondaries colour of primaries, with yellowish hyaline patch at base, and an almost round spot just beyond the middle. Expanse, 40–44 millim.

Four male specimens from the province of Kwei-chow. Taken in June or July.

Habitat. Western China.

In one example the hyaline spot towards costa is small, and that below cell is absent.

Syntomis persimilis, sp. n.

Head, thorax, and abdomen black; frons and tegulæ yellow; abdomen with six yellow bands. Wings black shot with purple. Primaries have five large hyaline spots, each of the three outer ones intersected by a nervule. Secondaries have two large hyaline spots, the outer one intersected by a nervule. Expanse, 36 millim.

Two female specimens from Ni-tou, and one from Omei-shan. Taken in June and July.

Habitat. Western China.

Allied to *S. perixanthia*, Hamps., but distinguished by the collar being black instead of yellow, and by the absence of yellow band on the metathorax. It is also a much smaller species.

Syntomis swinhoei, sp. n.

Allied to *S. actea*, Swinh., but the frons and head are black; the fronts of the tegulæ and the metathorax are marked with yellow. The abdomen of male has seven yellow bands, and that of the female six. On the primaries the black along fifth vein between the discal bar and marginal border is narrower, as also is the marginal border of secondaries. Expanse, ♂ 35 millim., ♀ 36 millim.

A male specimen from Moupin, taken in June, and a female from Chia-ting-fu, captured in July.

Var. *obsoleta*, nov.

In this form the upper hyaline spot of the subapical trio is absent, and also the spot between the interno-median bar and the two submarginal spots; the border of secondaries is broader. Expanse, 34 millim.

One female example from Ningpo, taken in July.

Habitat. Western China (type), North-eastern China (var.).

Syntomis dichotoma, sp. n.

Frons white; head and thorax black; abdomen bluish black, with four yellow bands, first and fourth broader than the others; antennæ black, becoming white towards tip. Primaries black with a purplish reflection; there are eight hyaline spots (one subdorsal, one nearly filling the discal cell, two subapical, and four below); in the male the third of the series of four is double; fringes marked with white below apex. Secondaries hyaline, broadly bordered with black, the inner edge of the border toothed. Expanse, ♂ 40–44 millim., ♀, 43–46 millim.

A long series from Moupin, taken in June.

Var. *concurrens*, nov.

Differs from the type in having the subbasal spot of primaries united with the fourth of outer series, as in *S. davidi*, which species it greatly resembles in the character of markings.

Four specimens from Kia-ting-fu, and one from the province of Kwei-chow, June and July.

Habitat. Western China.

Syntomis aucta, sp. n.

Closely resembles *S. davidi*, but the space between the costa and subcostal nervure is hyaline, and there is a small hyaline spot separated from the interno-median bar by the first vein; the black border of secondaries is rather broader, and the tooth larger; the tegulæ are marked with yellow; the abdomen of the male has seven yellow bands, and that of the female six, all of nearly uniform width. Expanse, ♂ 34 millim., ♀ 36–38 millim.

One male specimen and two females from the province of Kwei-chow, taken in June or July.

Habitat. Western China.

Syntomis consequa, sp. n.

Female. Wings almost exactly identical with those of *S. rubrozonata*, but the frons is greyish, the collar is yellow, and there are six yellow bands on abdomen, the first of which is broad. Expanse, 28 millim.

One female specimen from Moupin, taken in June.

Habitat. Western China.

Syntomis euryzona, sp. n.

Frons yellow; head, thorax, and abdomen black, the latter with seven yellow bands, and the prothorax and metathorax each have a yellow patch. Antennæ black, apical third white. Primaries black, with the following yellowish markings: a bar in the interno-median interspace, with a spot above and a diffuse streak below its outer portion; a cuneiform spot in the discal cell, and four other spots beyond the cell; the second of these spots is also cuneiform, and separated from that in the cell by a black bar on the discoidals; all the hyaline markings are contiguous, and only separated one from the other by the venation. Secondaries yellowish hyaline, with a broad black border which is toothed on its inner edge. Expanse, 43 millim.

One male specimen from Moupin, taken in June. Allied to *S. pascus*, Leech.

Habitat. Western China.

Syntomis leucoma, sp. n.

Frons, tegulæ, and fore tibiæ white; thorax and abdomen black, the latter with seven yellow bands, the last two of which are almost confluent. Primaries hyaline, venation black; there is a black spot at outer extremity of cell, and this is united by a bar with the broad apical portion of the black outer marginal border; the latter is toothed at veins 2 and 3; there is a curved black streak along inner margin. Secondaries hyaline, with black outer border which is broadest at apex. Expanse, 28 millim.

One male specimen from Omei-shan, taken in June.

Habitat. Western China.

SOME CHANGES IN THE NOMENCLATURE AND ARRANGEMENT OF BRITISH LEPIDOPTERA-HETEROCERA.

Dr. Sharp says ('Insects,' pt. i. p. 171):—"It is estimated that about 250,000 species [of insects] have been already described and have had scientific names given to them, and it is considered that this is probably only about one-tenth of those that really exist. The classification in a comprehensible manner of such an enormous number of forms is, it will be readily understood, a matter of great difficulty. Several methods or schemes have since the time of Linnæus been devised for the purpose, but . . . most of them have fallen into disuse, and have only an historical interest. Even at present there exists, however, considerable diversity of opinion on the question of classification, due in part to the fact that some naturalists take the structure of the perfect or adult insect as the basis of their arrangement, while others prefer to treat the steps or processes by which the structure is attained as being of primary importance."

Entomological science, it must be admitted, has made enormous strides, and at the present time our knowledge of the Order Lepidoptera is far greater than it was, say, even ten years ago. We must, however, still ask ourselves whether it is yet advisable for us to break away from the old system of arrangement and to adopt either of the others that have been submitted to us. The time will come, no doubt, when a change will have to be made, but this will hardly be until a system has been devised that from its thoroughness shall command universal acceptance.

The majority of lepidopterists in this country are probably satisfied with the classification and arrangement of British moths and butterflies now in use, which in the main accords with the system adopted on the continent. I have, however, been urged to publish a new edition of the 'Entomologist Synonymic List' giving all the changes in nomenclature introduced since 1884. Such a compilation would be expensive to print, and I am afraid would hardly meet with general support. It has occurred to me, however, that something provisional might be attempted, and I have therefore made the following rough jottings and extracts from 'A Synonymic Catalogue of Lepidoptera-Heterocera,' by Mr. W. F. Kirby, and 'Fauna, British India, Moths,' by Sir George F. Hampson; together with reference, where necessary, to 'A Handbook of British Lepidoptera,' by Mr. Edward Meyrick.—Richard South.

SPHINGES.

Sphingidæ, Bdr.

(Subfamily Acherontiinæ, Hampson; Manducinæ, Kirby.)

Acherontia atropos, Linn.—Hampson and Meyrick retain this species in *Acherontia*, Ochs., but Kirby places it in *Manduca*, Hübn. (Tentamen, p. 1 (1810?)).

(Subfamily Sphinginæ, Hampson and Kirby.)

Sphinx convolvuli, Linn.—Included by Hampson in *Protoparce*, Burmeister, of which *rustica*, Walk., from Brazil is the type. Kirby sinks *Protoparce* in *Phlegethontius*, Hübn. (type *sexta*, Joh., from America), and *convolvuli* is No. 36 of the forty-one species referred by him to the genus. Meyrick refers to the species under *Sphinx*, Linn.

Sphinx ligustri, Linn.—The type of *Sphinx*, Linn.

Sphinx pinastri, Linn.—According to Kirby this is the type of *Hyloicus*, Hübn., which Hampson includes in *Protoparce*, Burm. Meyrick places this species in *Sphinx*, Linn.

(Subfamily Chœrocampinæ, Kirby, [Chæo.] Hampson.)

Chœrocampa elpenor, Linn., and C. celerio, Linn.—Hampson retains both species in *Chœrocampa*, Dup., giving the first-named as the type; but Kirby sinks this genus in *Theretra*, Hübn. (type *T. nessus*, Drury), to which one hundred and fifteen species are referred, including *elpenor* (No. 1) and *celerio* (No. 31). Meyrick places both species in *Deilephila*, Ochs.

Chœrocampa porcellus, Linn.—Kirby gives this as the type of *Metopsilus*, Duncan (Nat. Libr. Brit. Moths, p. 154 (1836). Some of the Indian species included in this genus by Kirby are referred by Hampson to *Theretra*, others to *Chœrocampa*, one to *Ampelophaga*, and one to *Gurelca!* Meyrick refers *porcellus* to *Deilephila*, Ochs.

CHŒROCAMPA NERII, Linn.—The type of *Daphnis*, Hübn., and adopted as such by Hampson, but included by Meyrick in *Deilephila*, Ochs. Kirby does not indicate the type of *Daphnis*, but he places *nerii* first in this genus.

(Subfamily SMERINTHINÆ, Kirby.)

SMERINTHUS OCELLATUS, Linn.—The type of *Smerinthus*, Latr.

SMERINTHUS POPULI, Linn.—According to Kirby this species is the type of *Amorpha*, Hübn., but Meyrick leaves it in *Smerinthus*.

SMERINTHUS TILIÆ, Linn.—Kirby gives this as the type of *Dilina*, Dalm., and Meyrick also refers the species to this genus.

(Subfamily MACROGLOSSINÆ, Hampson and Kirby.)

MACROGLOSSA STELLATARUM, Linn.—Type of the genus.

MACROGLOSSA FUCIFORMIS, Linn., and M. BOMBYLIFORMIS, Ochsen. — The first-named is the type of *Hemaris*, Dalm., according to Kirby, but Hampson gives *scabiosæ*, Zell., which Kirby refers, as a synonym, to *H. tityus*, Linn. = *bombyliformis*, Auct.

SESIIDÆ.

The eighth family according to Hampson's arrangement, but other systematists place this family in TINEINA. Meyrick, for example, makes it the first family (Ægeriadæ) in the division, immediately followed by the Gelechiadæ.

ZYGÆNIDÆ.

(Subfamily ZYGÆNINÆ, Hampson.)
(Subfamily ANTHROCERINÆ, Kirby.)

Note.—Meyrick refers this family, together with the Zeuzeridæ and the Heterogeneidæ, to PSYCHINA.

ZYGÆNA FILIPENDULÆ, Linn.—The type of the genus *Zygæna*, Fabr. (Hampson), but Kirby gives the same species as the type of *Anthrocera*, Scop., and *phegea*, Linn., as the type of *Zygæna*, Fabr.

The following is the synonymy of the British species according to Kirby:—

ZYGÆNA PILOSELLÆ (Ent. Syn. List.)

Anthrocera purpuralis, Müll. (*Sph. p.*), Zool. Dan. p. 116, n. 1345 (1776).

Zygæna pythia, Fabr. Gen. Ins. p. 275 (1777); Fuessly, Mag. Ent. i. p. 140, pl. 1, fig. 6 (1778).

Sph. pilosellæ, Esp. Schmett. ii. p. 186, pl. 24, figs. 2a, b (1781), ii. (2) p. 14, pl. 40, figs. 3–6, p. 32, pl. 44, fig. 10 (1789).

Sph. minos, Den. and Schiff. Verz. Schmett. Wien, p. 45, n. 1 (1776); Hübn. Beitr. Gesch. Schmett. ii. (1) p. 20, pl. 3, O (1790); Eur. Schmett. ii. fig. 8 (1797). *Zyg. m.*, Ochs. Schmett. Eur. p. 22 (1808); Herr.-Schäff. Schmett. Eur. p. 30, n. 10, figs. 13–15 (1846); Dup. Lép. France, Suppl. ii. p. 40, pl. 4, fig. 4 (1835); Boisd. Icones, ii. p. 41, pl. 52, fig. 5 (1834).

Zyg. pluto, Boisd. *l. c.* ii. p. 40, pl. 52, fig. 4 (1834); Dup. *l. c.* ii. p. 38, pl. 4, fig. 3 (1835).

Zyg. heringi, Zell. Stett. Ent. Zeit. v. p. 42 (1844).

Var. a. *Z. pilosellæ* ab. *interrupta*, Staud. Cat. Lep. Eur. p. 45, n. 590d (1871).

Var. b. *Z. nubigena*, Led. Verh. Zool. Bot. Ges. Wien, ii. p. 93 (1852); Birch. Ent. Mo. Mag. iii. p. 33, pl. 1, fig. 6 (1866).

Var. c. *Zyg. p.* var. *diaphana*, Staud. Stett. Ent. Zeit. xxxi. p. 31 (1887).

ZYGÆNA EXULANS, E. S. L.

Anthrocera exulans, Hochenw. and Reiner (*Sph. e.*), Bot. Reisen, p. 55, pl. 6, fig. 1 (1792); Esp. *l. c.* ii. (2) p. 17, pl. 41, figs. 1, 2 (1793); Hübn. figs. 12, 101 (1803?). *Zyg. e.*, Ochs. *l. c.* p. 40 (1808); Boisd. Mon. Zyg. p. 47, pl. 3, fig. 3 (1829).

Var. a. *Zyg. e.* var. *subochracea*, White, Scott. Nat. i. p. 175 (1872).

Var. b. *Zyg. vanadis*, Dalm. Vet. Acad. Handl. 1816, p. 223.

ZYGÆNA MELILOTI, E. S. L.

Anthrocera viciæ, Fuessly (*Sph. v.*), Neues Mag. ii. p. 208 (1785).

Sph. meliloti, Esp. *l. c.* p. 10, pl. 39, figs. 1–8 (1789). *Zyg. m.*, Ochs. *l. c.* p. 43 (1808); Boisd. *l. c.* p. 51, pl. 3, fig. 5 (1829); Herr.-Shäff. *l. c.* p. 35, figs. 63, 78 (1846).

Sph. loti, Hübn. *l. c.* fig. 82 (1803).

Sph. loniceræ var., Esp. *l. c.* p. 195, pl. 25, fig. 3 (1781).

Zyg. buglossi, Dup. *l. c.* p. 138, pl. 12, fig. 4 (1835).

Var. a. *Zyg. stentzii*, Freyer, Neu. Beitr. iii. p. 120, pl. 278, fig. 4 (1839).

Zyg. meliloti var. *stentzii*, Herr.-Schäff. *l. c.* p. 36, figs. 86, 87 (1846).

Var. b. *Zyg. dahurica*, Boisd. Icones, ii. p. 57, pl. 54, fig. 7 (1834).

Z. dorycnii, Dup. *l. c.* ii. p. 135, pl. 12, fig. 3 (1834).

Var. c. *Z. mel.* var. *confusa*, Staud. Stett. Ent. Zeit. xlii. p. 398 (1881).

ZYGÆNA TRIFOLII, E. S. L.

Anthrocera trifolii, Esp. (*Sph. t.*) *l. c.* p. 223, pl. 34, figs. 4, 5 (1783); Hübn. *l. c.* figs. 99, 134, 135 (1818?). *Zyg. t.*, Ochs. *l. c.* p. 47 (1808); Boisd. Mon. Zyg. p. 54, pl. 3, fig. 7 (1829). *Anthr. t.*, Steph. Ill. Brit. Ent. Haust. ii. p. 108 (1828).

Sph. pratorum, De Vill. Ent. Linn. ii. p. 114, n. 60 (1789).
Var. a. *Sph. glycirrhizæ*, Hübn. fig. 138 (1818); Freyer, *l. c.* ii. p. 116, pl. 164, fig. 3 (1836).
Var. b. *Zyg. trifolii* var. *confluens*, Staud. Cat. Lep. Eur. p. 47, n. 611a (1871).
Sph. achilleæ et *filipendulæ*, Geyer, *l. c.* ii. figs. 165, 166 (1841).
Zyg. t. var. *minoides*, De Selys, Mém. Soc. Liège, ii. p. 6 (1845).
Zyg. scabiosæ, Haw. Lep. Brit. i. p. 74 (1803).
Var. c. *Sph. orobi*, Hübn. *l. c.* fig. 133 (1818 ?).
Var. d. *Anthr. meliloti*, Steph. *l. c.* p. 107 (1828); Westw. and Humphr. Brit. Moths, i. p. 29, pl. 6, figs. 15, 16 (1843).
Var. e. *Zyg. syracusia*, Zell. Isis, 1847, p. 301. *Sph. s.*, Freyer, *l. c.* vi. p. 39, pl. 506, fig. 1 (1852). *Zyg. australis*, Led. *l. c.* ii. p. 71 (1852); Walk. Cat. Lep. Hel. B. M. i. p. 84, n. 30 (1854).
Zyg. trifolii var., Ramb. Cat. Lép. And. p. 177, pl. 1, figs. 5–8 (1858–1866).
Var. f. *Zyg. t.* var. *gracilis*, Fuchs, Stett. Ent. Zeit. xli. p. 118 (1880).

ZYGÆNA LONICERÆ, E. S. L.
Anthrocera loniceræ, Schev. (*Sph. l.*) Naturf. x. p. 97 (1777); Fuessly, Mag. i. p. 140, pl. 1, fig. 1 (1778); Esp. *l. c.* p. 183, pl. 24, figs. 1, a, b (1781), ii. (2), p. 12, pl. 39, figs. 9–14 (1789); Hübn. *l. c.* figs. 7, 160 (1797–1818). *Zyg. l.*, Ochs. *l. c.* p. 49 (1808); Boisd. *l. c.* p. 56, pl. 3, fig. 8 (1829).
Zyg. fulvia, Fuessly, *l. c.* pp. 114, 139, pl. 1, fig. 1 (1778).
Sph. graminis, De Vill. Ent. Linn. ii. p. 115, n. 61 (1789).
Zyg. loti, Haw. *l. c.* p. 74 (1803). *Anthr. l.*, Steph. *l. c.* p. 109 (1828).
Anthr. trifolii, Wood. Ind. Ent. pl. 4, fig. 3 (1839).
Var. a. *Zyg. l.* var. *eboracæ*, Prest, Ent. xvi. p. 273 (1883); Proc. Ent. Soc. Lond. 1883, p. xxviii.
Var. b. *Zyg. l.* var. *major*, Frey. Lep. Schweiz, p. 67 (1880).
Var. c. *Zyg. l.* ab. *citrina*, Spey. Stett. Ent. Zeit. xlviii. p. 334 (1888).

ZYGÆNA FILIPENDULÆ, E. S. L.
Anthrocera filipendulæ, Linn. (*Sph. f.*) Syst. Nat. i. p. 494 n. 32 (1758); Faun. Suec. p. 290 (1761); Esp. *l. c.* p. 138, pl. 16a–e (1780), p. 233, pl. 36, fig. 8 (1783). *Zyg. f.*, Ochs. *l. c.* p. 54 (1808); Godt. Lép. France, iii. p. 127, pl. 22, fig. 2 (1821); Boisd. *l. c.* p. 59, pl. 4, fig. 1 (1829); Curt. Brit. Ent. xii. pl. 547 (1835). *Anthr. f.*, Steph. *l. c.* p. 110 (1828).
Adscita aries, Retz. Gen. Sp. Ins. p. 35, n. 35 (1783).

Var. a. *Sph. chrysanthemi*, Esp. *l. c.* ii. (2) p. 1, pl. 37, fig. 1 (1789).

Var. b. *Sph. cytisi*, Hübn. *l. c.* fig. 26 (1797 ?).

Var. c. *Anthr. hippocrepidis*, Steph. *l. c.* p. 109, n. 5 (1828); Wood. *l. c.* pl. 4, fig. 6 (1839).

Var. d. *Zyg. fil.* var. *arctica*, Schneid. Tromsö Mus. Aarsh. iii. p. 85 (1880).

Var. e. *Zyg. mannii*, Herr.-Schäff. *l. c.* vi. p. 44, figs. 109, 110 (1851–1852).

Var. f. *Zyg. ochsenheimeri*, Zell. Isis, 1847, p. 303.

Sph. filipendulæ major, Esp. *l. c.* ii. (2) p. 19, pl. 41, fig. 4 (1789).

Zyg. transalpina, Boisd. *l. c.* p. 63, pl. 4, fig. 3 (1829); Icones, ii. p. 67, pl. 54, fig. 10 (1834); Dup. *l. c.* ii. p. 64, pl. 6, fig. 1 (1835); Herr.-Schäff. *l. c.* p. 42, figs. 61, 62 (1846).

Var. g. *Zyg. ramburi*, Led. Wien. Ent. Mon. v. p. 151, pl. 1, fig. 10 (1861); Herr.-Schäff. Neue Schmett. p. 32, figs. 161, 162 (1861).

Zyg. gurda, Led. *l. c.* p. 152, pl. 1, fig. 9 (1861).

Zyg. mersina, Herr.-Schäff. *l. c.* p. 32, fig. 163 (1861).

BOMBYCES.

NYCTEOLIDÆ.

SAROTHRIPUS UNDULANS, Hübn.—Kirby places this species in the Lithosiidæ under the name *Nycteola revayana*, Scop., but Hampson refers it to the Noctuidæ, including it in the subfamily Sarrothripinæ as *Sarrothripa revayana*, Scop.

EARIAS CHLORANA, Linn.; HYLOPHILA PRASINANA, Linn.; and H. BICOLORANA, Fues. — These species belong to the Arctiid subfamily Nycteolinæ of Hampson's arrangement, while Kirby includes them in Cymbidæ, a family placed between the Arctiidæ and the Lithosiidæ.

NOLIDÆ.

NOLA, Leach, of which *cucullatella*, Linn., is the type, is the representative genus of Nolinæ, a subfamily of Hampson's Arctiidæ; he remarks that some of the forms of this group are hardly structurally separable from Sarrothripinæ, which he refers to the Noctuidæ. Kirby places *Nola* in the family Lithosiidæ, and adopts *albula*, Den. and Schiff., for *albulalis*, and *ærugula*, Hübn., for *centonalis*.

Meyrick refers *strigula*, Schiff., and *albula*, Hübn., to *Uraba*, Walk.; and *centonalis*, Hübn., and *confusalis*, H.-S., to *Rœselia*, Hübn.

LITHOSIIDÆ.

CALLIGENIA MINIATA, Forst.—Hampson and Kirby both give this as the type of *Miltochrista*, Hübn., and this genus is adopted by Meyrick for *miniata* and *senex*.

LITHOSIA MESOMELLA, Linn.—This is the type of *Cybosia*, Hübn., according to Kirby, who gives *Lith. lutarella*, Haw., as a variety of *C. mesomella*. Meyrick also uses *Cybosia* for this species.

LITHOSIA MUSCERDA, Hufn.—Kirby indicates this species as the type of *Samera*, Wallengren (Wien. Ent. Mon. vii. pp. 146, 147), but Meyrick retains it in *Lithosia*.

LITHOSIA SORORCULA, Hufn.—The type of *Systropha*, Hübn., which Hampson merges in *Lithosia*, Fabr. Meyrick leaves this species in *Lithosia*.

LITHOSIA COMPLANA, Linn. — The type of *Lithosia*, Fabr.; *griseola*, Hübn., *lurideola*, Zinck., *sericea*, Gregs., and *lutarella*, Linn., all belong to this genus.

LITHOSIA DEPLANA, Esp.—Kirby sinks the name *deplana*, Esp., in favour of *depressa*, Esp., and indicates it as the type of *Pelosia*, Hübn.

LITHOSIA CANIOLA, Hübn.—The type of *Eilema*, Hübn. (Kirby), included in *Lithosia*, Fabr., by Hampson and Meyrick.

GNOPHRIA QUADRA, Linn., and G. RUBRICOLLIS, Linn.—*Quadra* is the type of *Œonistis*, Hübn., and *rubricollis* the type of *Gnophria*, Stephens.

EMYDIA CRIBRUM, Linn.—Kirby refers this species, as *cribraria*, Linn., to *Coscinia*, Hübn., the type of which genus is *striata*, Linn. = *grammica*, Linn. This genus is also used by Meyrick for both species.

EUCHELIIDÆ.

DEIOPEIA PULCHELLA, Linn.—Kirby and Meyrick refer this species to *Utetheisa*, Hübn. (the type of which is *ornatrix*, Linn.), and the former places it in the Lithosiidæ. Hampson includes it, under the name *Deiopia pulchella*, in his Arctiid subfamily Lithosiinæ.

EUCHELIA JACOBÆÆ, Linn.—The type of *Hipocrita*, Hübn., according to Kirby, and placed by him in the Lithosiidæ. Meyrick refers this species to *Tyria*, Hübn.

(ARCTIIDÆ, Kirby and Hampson.)

CALLIMORPHA DOMINULA, Linn., and C. HERA, Linn.—The first-named species is the type of the genus *Callimorpha*, Latr., but Kirby sinks *hera*, Linn., as a synonym of *quadripunctaria*, Poda (Mus. Græc. p. 89 (1761)), and makes it the type of *Euplagia*, Hübn. Meyrick retains *Callimorpha* for *hera*.

CHELONIIDÆ.

(Subfamily ARCTIINÆ, Kirby and Hampson.)

NEMEOPHILA RUSSULA, Linn.—The type of *Diacrisia*, Hübn., according to Kirby, who refers to it as *D. sannio*, Linn. Meyrick includes this species, together with *mendica*, Clerck, *urticæ*, Esp., *menthastri*, Esp., and *lubricipeda*, Linn., in *Diacrisia*.

NEMEOPHILA PLANTAGINIS, Linn.—Kirby gives this as the type of *Parasemia*, Hübn., but Meyrick places the species in *Arctia*, Schrank.

ARCTIA CAIA, Linn., and A. VILLICA, Linn.—The latter species is the type of *Arctia*, Schrank; and Hampson also includes *orientalis*, Moore, which is probably an Indian form of *caia*, Linn., in this genus; but Kirby gives *caia* as the type of *Hypercompa*, Hübn. The latter species, and also *villica*, are referred to *Arctia* by Meyrick.

SPILOSOMA FULIGINOSA, Linn. — The type of *Phragmatobia*, Stephens.

(Subfamily SPILOSOMATINÆ, Kirby.)

SPILOSOMA MENDICA, Clerck.—The type of *Diaphora*, Stephens.

SPILOSOMA MENTHASTRI, Esp., and S. URTICÆ, Esp.—The first named is the type of *Spilosoma*, Stephens; but as Kirby has adopted *lubricipeda*, Linn., it may be useful to give his full synonymy of this, and also of the species usually referred to as *S. lubricipeda*, Esp.:—

S. lubricipeda, Linn. (*Bombyx l.*), Syst. Nat. i. p. 505, n. 47 (1758); Faun. Suec. p. 303 (1761). *Phalæna l.*, Scop. Ent. Carn. p. 208, n. 513 (1763).

Bomb. lubricipeda alba, Hufn. Berl. Mag. ii. p. 412, n. 25 (1766).

Phal. lepus, p., Retz. Gen. Spec. Ins. p. 37, n. 47 (1783).

Bomb. menthastri, Esp. Schmett. iii. p. 334, pl. 66, fig. 6–10 (1786); Hübn. Eur. Schmett. ii. figs. 152, 153 (1804 ?). *Euprepia m.*, Ochs. Schmett. Eur. iii. p. 354 (1810). *Chelonia m.*, Godt. Lép. France, iv. p. 362, pl. 37, fig. 5 (1822). *Spilosoma m.*, Steph. *l. c.* ii. p. 75, pl. 16, fig. 3 (1828).

Phal. erminea, Marsh. Trans. Linn. Soc. Lond. i. p. 70, pl. 1, fig. 1 (1791).

Bomb. mendica, ♀, Rossi, Faun. Etrusc. ii. p. 174, n. 1603 (1790).

Var. a. *Spil. walkeri*, Curt. Brit. Ent. ii. pl. 92 (1825).

Chel. menthastri, var., Godt. *l. c.* pl. 37, fig. 6 (1822).

Var. b. *Chel. luxerii*, Godt. *l. c.* p. 360, pl. 37, fig. 4.

SPILOSOMA LUBRICIPEDA, Esp.—The type of *Spilarctia*, Butl. (Cistula, Entom. ii. p. 39), which Hampson merges in *Spilosoma*. Kirby gives the following synonymy of the species:—

S. lutea, Hufn. (*Bombyx lubricipeda lutea*), Berl. Mag. ii. p. 412, n. 26 (1766).

Bombyx lubricipeda, β, Linn. Syst. Nat. i. p. 506, n. 47 (1758). *B. lubric.* ♂, Linn. Faun. Suec. p. 303 (1761); *Bomb. l.*, Esp. Schmett. iii. p. 330, pl. 66, figs. 1–5 (1786); Marsh. Trans. Linn. Soc. Lond. i. p. 71, pl. i. fig. 2 (1791); Hübn. Eur. Schmett. ii. figs. 155, 156 (1804?). *Euprepia l.*, Ochs. Schmett. Eur. iii. p. 358 (1810). *Chelonia l.*, Godt. Lép. France, iv. p. 358, pl. 37, fig. 3 (1822). *Spilosoma l.*, Steph. Ill. Brit. Ent. Haust. ii. p. 77 (1828).

Phalæna lepus, p., Retz. Gen. Spec. Ins. p. 37, n. 47 (1783).

Var. a. *Noctua zatima*, Stoll. Pap. Exot. iv. pl. 381, fig. F (1781). *Spil.* (?) *z.*, Mill. Ann. Soc. L. Lyon (2), xi. p. 26, pl. 49, fig. 5–7 (1864).

Bomb. radiatus, Haw. Ent. Trans. i. p. 336 (1812). *Spilos. radiata*, Steph. *l. c.* p. 77 (1828); Westw. and Humph. Brit. Moths, i. pp. 88, 92, pl. 18, fig. 19 (1843).

Var. b. *Spilos. z.* var. *deschangei*, Dep. Ann. Soc. Ent. France (6), vi. p. 283, pl. 4, fig. 4 (1886).

Note.—All the species referred to above under the heading Bombyces are included by Meyrick in the family Arctiadæ of his division Caradrinina.

(To be continued.)

DESCRIPTIONS OF EIGHT NEW SPECIES OF SOUTH AMERICAN CHRYSOMELIDÆ.

By Martin Jacoby, F.E.S.

Lamprosphærus igneipennis, n. sp.

Below piceous, with more or less metallic blue or green, above bright cupreous; antennæ fulvous; thorax remotely and finely, elytra strongly and semi-regularly punctured, narrowly margined with metallic blue at the sides; tarsi piceous. Length, 4–5 mill.

Head with a more or less distinct central groove, metallic green, strongly and remotely punctured, the clypeus separated from the face by distinct grooves, sparingly punctured, its anterior edge concave; labrum fulvous, stained with piceous; palpi slender, fulvous; antennæ nearly extending to the apex of the elytra, fulvous, the apical joint piceous, the third and following joints very elongate and slender; thorax three times broader than long, the sides rounded, strongly narrowed towards the apex, narrowly margined, the disc finely and sparingly punctured, cupreous, the margins more or less metallic blue; the scutellum cupreous, its apex pointed; elytra with a shallow transverse depression below the base, oblong-ovate, bright cupreous, rather strongly punctured in semi-regular somewhat distantly placed rows, the lateral margins metallic blue; under side and legs more or less dark bluish or greenish, the sides of the breast piceous; tarsi of the latter colour or fulvous; prosternum much broader than long.

Hab. Amazons.

I have preserved the name given to this species by the late M. Lefèvre, who examined the insect.

Chrysodina alutacea, n. sp.

Obscure æneous, above obscure cupreous, base of the antennæ fulvous; upper surface minutely granulate; thorax finely and subremotely, elytra distantly punctured in longitudinal rows. Length, 4 mill.

Of an obscure opaque cupreous colour; the head minutely granulate and extremely finely punctured; the antennæ very short, the lower six joints fulvous, the rest black, the penultimate four joints strongly widened, the terminal one more elongate but thickened; thorax about one-half broader than long, the basal margin broadly rounded and produced at the middle, the surface minutely granulate, finely and rather remotely punctured, the sides obliquely narrowed towards the apex, the basal margin with a row of closely placed stronger punctures at the sides; scutellum broad, its sides rounded, impunctate; elytra sculptured and punctured like the thorax, but the punctures widely placed and arranged in distant longitudinal rows, the last two interstices at the sides slightly convex; under side and legs very dark æneous.

Hab. Bolivia.

The entire very finely granulate upper surface of this species, giving it an opaque but submetallic appearance, will distinguish it from any other described *Chrysodina*. I have preserved the name given to it by Lefèvre, who had the insect for examination.

Chrysodina cupricollis, n. sp.

Blackish, the breast metallic green; head and thorax bright cupreous, strongly and subremotely punctured; elytra metallic green, strongly subgeminate, punctate-striate. Length, 4 mill.

Head minutely granulate, remotely but distinctly punctured; clypeus wedge-shaped, punctured like the head, its anterior edge oblique at the sides, emarginate at the middle; labrum and palpi piceous; antennæ black, the lower five joints more or less fulvous, the basal one metallic green above; thorax twice as broad as long, the sides obliquely rounded and narrowed in front, the surface rather remotely and strongly punctured, bright cupreous, the basal margin with a row of stronger punctures; scutellum broad, cupreous, impunctate; elytra much more strongly punctured than the thorax, metallic green, the basal portion without depression, the punctures anteriorly arranged somewhat in double rows, singly below the middle, the interstices flat and impunctate, below nearly black, the breast metallic green, the tibiæ slightly of the latter colour; tarsi piceous.

Hab. Rosario, Argentine Republic.

Of same coloration as *C. opulenta*, Lefèv., but nearly black below; the head and thorax of different sculpture; the antennæ differently coloured. Two specimens in my collection.

Chrysodina paraguayensis, n. sp.

Metallic bluish below, above metallic green; the basal joints of the antennæ fulvous; head and thorax subremotely and finely punctured;

elytra more strongly punctured in semi-regular rows, the last interstice costate. Length, 5 mill.

Head rather strongly but not closely punctured; the epistome not separated from the face, its anterior margin very slightly concave; labrum black; antennæ extending to the base of the thorax, black, the lower five joints fulvous, the basal joint stained with piceous above, terminal joints broader than long; thorax twice as broad as long, the sides strongly and obliquely narrowed in front, the surface finely but not very closely punctured, the interstices sparingly and still more finely punctate, the base scarcely produced at the middle, the basal margin with a row of stronger punctures; scutellum much broader than long; elytra with a short but distinct transverse depression below the base, the sides narrowly marginate, the surface rather strongly punctured in somewhat close rows, the outer interstice costate from below the shoulders to the apex; under side dark blue, nearly impunctate; tarsi blackish; prosternum longer than broad, rugose, and pubescent.

Hab. Paraguay.

One of the larger-sized species, which may be known by the blue under and green upper surface, the colour of the antennæ, and their very broad terminal joints.

Chrysodina peruana, n. sp.

Violaceous, above metallic cupreous; head and thorax very finely and closely punctured; elytra more strongly punctate, the punctures arranged in rows, the last interstice at the side costate near the apex. Length, 6 mill.

Head extremely minutely granulate, rather closely and strongly punctured; the clypeus not separated from the face, subquadrate; palpi stained with metallic green; antennæ black, the lower four joints fulvous below, metallic greenish above, terminal joints very strongly transverse, much broader than long, extending beyond the base of the thorax; the latter twice as broad as long, of the usual shape, the punctuation fine and close, with still smaller punctures at the interstices; scutellum broader than long, cupreous, with a few punctures; elytra punctate-striate, the punctures stronger than those of the thorax, each elytron with about fifteen or sixteen rows, somewhat unevenly placed, the last interstice strongly costate below the middle; under side and legs violaceous blue, nearly impunctate; tarsi piceous.

Hab. Peru.

Of larger size, but similar coloration as *C. fulgurans*, Har.; the terminal joints of the antennæ much broader than in that species and of different colour, the punctuation of the thorax finer and closer.

Deuterocampta opaca, n. sp.

Greenish black; head and thorax greenish æneous, opaque, sparingly punctured; elytra obscure fulvous, opaque, distinctly punctate-striate. Length, 10 mill.

Head greenish, opaque, with a few fine punctures; the anterior margin of the clypeus straight; antennæ black, the basal two joints flavous below, terminal joints distinctly widened, scarcely longer than broad; thorax three times broader than long, the sides straight at the base, moderately rounded in front, the anterior angles not mucronate, the surface dull opaque greenish æneous, very sparingly punctured, the sides with some stronger punctures; scutellum metallic green; elytra wider at the base than the thorax, regularly convex, rather strongly and regularly punctate-striate, dull and opaque, fulvous, the interstices entirely impunctate; epipleuræ, the under side, and legs dark metallic greenish.

Hab. Brasils.

A species of very dull colouring, and somewhat silky appearance, allied to *D. æneo-lucens*, Stål, which is described as having the elytra "testaceo-pellucidis," and a distinctly punctured thorax.

Deuterocampta (?) *irregularis*, n. sp.

Black; the head with a small fulvous spot; thorax extremely finely and sparingly punctured; elytra fulvous, irregularly punctured in double and treble rows; terminal joint of the tarsi dentate. Length, 12–13 mill.

Head with a few fine punctures, black, the vertex with a small fulvous spot; ultimate joint of the palpi testaceous at the apex; thorax nearly three times broader than long, the sides straight and parallel at the base, rounded near the anterior angles; the latter rather produced, the disc very sparingly and finely punctured, the sides with some slightly larger punctures, black; scutellum triangular, black; elytra rather wider at the base than the thorax, entirely fulvous, rather strongly, closely, and irregularly punctured, the punctures here and there arranged in rows, although very indistinctly so; under side and legs black, the sides of the breast nearly impunctate; tibiæ only channelled near the apex, the claw-joint toothed at the apex; claws distant.

Hab. Bolivia.

This species scarcely fits into any of the groups of Stål's arrangement, and differs from almost any of its allies in the irregularly punctured elytra; the prosternum, however, scarcely differs from that of *Deuterocampta*, but the dentate claw-joint agrees with *Leptinotarsa*, from which it again differs in the non-sulcate tibiæ. Two specimens are contained in my collection. The species entirely resembles *Doryphora semifulva*, Jac., likewise from Bolivia, except in the structural characters.

Deuterocampta crux nigra, Stål, var. *bimaculata*.

Piceous; the labrum, antennæ, and the legs fulvous; thorax finely punctured, the disc blackish, the sides broadly flavous; elytra finely punctate-striate, flavous, the suture, the lateral margins posteriorly, and a small round spot below the middle of each elytron greenish black. Length, 11 mill.

Head finely and rather closely punctured, piceous, the vextex with a fulvous spot; the clypeus and the labrum fulvous; antennæ only extending to the base of the elytra, entirely fulvous, the terminal joints strongly transversely dilated and flattened; thorax twice as broad as long, the sides straight at the base, rounded anteriorly, the angles not produced, the middle of the disc finely and rather closely punctured, greenish black, this colour in shape of a broad transverse band which has the sides deeply concave, the latter bright flavous, nearly impunctate; elytra finely punctate-striate, the suture, a narrow stripe on the shoulders, the lateral margins and epipleuræ at the posterior half, and a spot below the middle near the sides greenish black.

Hab. Brasils. Oxford Museum collection and my own.

This variety, of which two specimens are before me, agrees in every particular with the typical form, except that the transverse narrow elytral band of the latter is here absent and replaced by a small round spot, which at first sight might suggest the specific distinction of the species; and as two exactly similar specimens are before me, I thought the variety deserving of another name, no other instance having ever come under my observation in regard to this species, the variety of which seems to be extremely rare.

Deuterocampta sedula, Stål.

This insect I believe to be only a variety of *D. pustulicollis*, Stål, in which the narrow elytral stripes have disappeared; there is no difference in any other respect between the two insects.

SYNOPSIS OF THE NORTH AMERICAN BEES OF THE GENUS *STELIS*.

By T. D. A. Cockerell, N. M. Agr. Exp. Sta.

The North American species of *Stelis* may be separated as follows:—

More or less blue or green	1.
Black, not at all blue or green	3.
1. Second recurrent nervure ending a little beyond tip of second submarginal cell; olive-green species. (Colo.)	*montana*, Cress.
Second recurrent nervure ending a little before tip of second submarginal cell; dark blue or blue-black species	2.
2. Length about 8 mm.; thorax strongly and sparsely punctured. (Calif.)	*subcærulea*, Cress.
Length about 6 mm.; thorax closely punctured. (Colo.)	*elegans*, Cress.
3. Length about 10 mm.; markings red. (Ga.)	*australis*, Cress.
Markings yellow	4.
Markings white or yellowish white	5.

4. Legs black, except knees and a line on anterior tibiæ; wings tinged with fuscous, darker on costa; abdominal bands uninterrupted. (Calif.)	*laticincta*, Cress.
Legs yellowish, femora and tibiæ behind partly black; wings fuliginous. (Indiana)	*obesa*, Say.
Legs entirely fulvo-ferruginous; wings subhyaline, costa broadly fuscous. (Tex., N.M.)	*costalis*, Cress.
5. Length about 5 mm.	6.
Length over 7 mm.; second recurrent nervure reaching second submarginal cell before its tip	8.
6. Pubescence of thoracic dorsum black. (Nev.)	*interrupta*, Cress.
Pubescence of thoracic dorsum whitish or griseous	7.
7. Abdomen with only six white spots. (Calif.)	*sexmaculata*, Ashm.
Abdomen with at least eight spots. (Pa., Ills.)	*lateralis*, Cress.
Abdomen with at least four slightly interrupted bands	*fæderalis*, Smith.
8. Pubescence mostly black	*rubi*, n. sp.
Pubescence pale	9.
9. Densely punctured. (Colo.)	*subemarginata*, Cress.
Sparsely punctured	10.
10. Abdominal bands broadly subemarginate at sides posteriorly. (Colo.)	*monticola*, Cress.
Abdominal bands not subemarginate at sides. (Canada, N.Y.)	*nitida*, Cress.

Stelis lateralis var. *permaculata*, n. var.

♂. Length about 4½ mm.; black, strongly punctured; abdomen with transverse subdorsal white marks on each of the first five segments, those on the fifth nearly obsolete, and similar lateral marks on the first three segments, making sixteen marks in all. Wings hyaline, slightly smoky on costa near apex, second recurrent nervure reaching second submarginal cell distinctly before its end. Pubescence all pale.

Hab. Santa Fé, New Mexico, July 7th (*Ckll.* 1339). Mr. C. Robertson records 16-spotted males of *lateralis* from Illinois, but does not state whether the venation was peculiar.

Stelis rubi, n. sp.

♀. Length about 8½ mm., fairly robust, shining, strongly and closely punctured, black, with cream-coloured marks on the abdomen, *viz.* narrow bands on first and second segments, very narrowly interrupted in the middle, and transverse median stripes on third and fourth, that on the third about twice as long as that on the fourth. The band on first segment is gently curved downwards at the sides; that on the second is narrowed to a mere line sublaterally, broadening at the extreme sides. These markings are only very sparsely punctured, and so shine more than the rest of the abdomen. Pubescence sparse, black; mixed with the black on the lower half of the face is some shorter silvery pubescence. Basal enclosure of middle segment smooth and shining, densely punctured along its base. Scutellum channelled at sides. Apical segment of abdomen dorsally keeled, the keel smooth and shining; apex produced to a very sharp point, with a small but abrupt notch on each side. Venter with minute close punctures. Legs black, hind tibiæ with a long apical spine, middle tibiæ with a pair of short spines. Anterior tarsi with some short orange-brown pubescence on inner side. Tegulæ black, punctured. Wings smoky, a darker shade in the marginal cell; nervures black, second recurrent nervure reaching second submarginal cell considerably before its apex; second submarginal cell conspicuously longer than first.

Hab. Seattle, Washington State, May 11th, 1897, at flowers of *Rubus ursinus*. Collected by T. Kincaid.

Mesilla Park, New Mexico, U.S.A.: May 31st, 1898.

NOTES AND OBSERVATIONS.

Tinea vastella.—In 'Nature' for June 9th last Mr. W. H. McCorquodale states that the horns of some antelope skulls that he received from West Africa were all "infested by singular, thin finger-like protuberances which seemed to grow from the horn." These he at first thought were fungi; but afterwards found them to be cocoons o *Tinea vastella*. A sketch of the skull and horns of a harte-beest, with the cocoons *in situ*, is given, and also separate figures of the cocoons, the latter drawn one-half natural size. Mr. McCorquodale says:—"A very interesting point with regard to the habits of this insect which has not yet been cleared up, but upon which I hope to be able to throw some light through the observations of officers now serving in Africa, is that it has been asserted to feed on the horns of living animals; and in support of this I will quote the following:—'Dr. Fitzgibbon, many years ago, while in Gambia, stated he was surprised at finding grubs enclosed in cases which projected from the horns of animals freshly killed, the blood not being yet dry, the carcases of the animals being exhibited in the market-place.' This statement is recorded in vol. i. of the 'Proceedings' of the Dublin Zoological Society:—'In contradiction, Lieut.-Colonel Wenman Coke said he had shot large numbers of various species of horned animals in South Africa, but that he had never seen the horn of a living animal perforated by one of these larvæ, although he had seen many dead horns infested by them. Colonel Coke is most confident that the larvæ never attack a living animal; he says that had this been the case it could not have escaped his observation. Mr. Truman concurs in expressing great doubt as to the correctness of the theory that the larvæ feed on the horns of living animals.' We have the strong evidence of Dr. Fitzgibbon, and might argue that as the fibrous substance of the horn undergoes little or no change at the death of the animal, there seems no reason why the moth should not deposit its eggs when the living animal is at rest, nor why the larvæ should not penetrate the horn. I venture to assert as my own opinion, and that of many sportsmen from whom I have made enquiries, that the larva does not feed on the horns of living animals; had this been the case, it would not have escaped the observation of some of our 'mighty African hunters.' Thus Dr. Fitzgibbon's statement stands alone; the question must, however, remain *sub judice*."

Erana graminosa.—This beautiful native green Noctuid exhibits a range of variation equalled only by a few other endemic species of moths. The specimen figured by Hudson, in his 'Manual of New Zealand Entomology,' is not quite typical of the species, as it occurs at Oamaru in the North Otago district. I collected a fine series there twelve years ago; and sent a good group of them to the Colonial Museum at Wellington shortly afterwards. Amongst them were at least a dozen specimens exhibiting distinctive phases of variation or varieties equally well defined as the forms of *Hydrœcia nictitans* figured by Mr. J. W. Tutt (Entom. xxi. 289). If a dozen distinctive forms were selected, and we were to begin with the darkest and end with the palest, Mr. Hudson's figure would range about fourth in the series. Recently I have seen a good series collected in the native vegetation at Wakauni, six miles seawards of Ashburton. Although not quite so variable as the Oamaru forms, there is considerable variation amongst them. The various shades of green exhibited by each variety are more distinct in some localities than in others.—W. W. Smith.

"Snowstorms in June."—Under this heading a writer in the 'Standard' (June 2nd), referring to the severe weather in North Hertfordshire and Bedfordshire, says:—"The unseasonable weather is proving disastrous to insect life, and scores of dead and stupified butterflies are lying about the garden." Can any reader of the 'Entomologist' corroborate this?

"Insect Grafting.—A discovery which may lead to important results has been made by Mr. Henry E. Crampton, Instructor in Biology in Columbia University. Mr. Crampton has been studying the work of a German scientist named Born, and has made a practical test of some of his theories, with extraordinary results. He has experimented on the embryo of the butterfly at the period of its existence when it lies inactive in its cocoon, after its life as a caterpillar. Everyone has seen the grub spinning its delicate nest on a leaf or twig, and entering it, as into a grave, remaining there eating nothing and apparently dead for a few weeks; and then emerging from it a beautiful creature with wings. Mr. Crampton collected a number of these cocoons, and operated on their insensible occupants. He found that he could cut the comatose creatures in half and join the half of one to the half of another without affecting the life of either. The chrysalids so joined accomplished the usual period of their retirement and emerged from it as two butterflies, with wonderful combinations of colours and organisms, apparently none the worse for the operation which had been performed. Prof. Smith, of the New Jersey Experiment Station, who has made the facts of Mr. Crampton's work known, believes that the discovery will constitute an era in biological science. The principle has an endless variety in possible forms of application, and may eventually reach to higher orders of life. The possibility of continuing two natures in a single living organism being once demonstrated, scientists will perceive how far-reaching may be the effects of such experiments."

The above paragraph, from the 'Christian Herald,' is reprinted in the June issue of 'Entomological News,' the organ of the Entomological Section of the Academy of Natural Sciences, Philadelphia, and the American Entomological Society.

VESPA ORIENTALIS.—Some account of this insect, as a species widely distributed in Bible lands, may possibly prove interesting. In the first place, though almost identical with its British congener, *Vespa crabro*, in point of colour, it may readily be distinguished from the latter insect in having a larger proportion of chestnut-brown covering the whole of the upper portion of the abdomen, and only the two lower segments consisting of yellow spotted with brown, instead of three or four as is the case with *V. crabro*. Also, if there is any difference in shape, *V. orientalis* is rather the more slender of the two. Never having myself come across a nest of this species, I of course cannot judge as to its composition, but infer that it may be of clay instead of wood from paling or hollow tree, after the manner of *V. crabro*, *V. vulgaris*, *V. germanica*, &c., when engaged in sawing with their mandibles the requisite materials for the preparation of their cells; and indeed on the confines of the Egyptian desert there are no timber trees, as a rule, with the sole exception of the date palm, for any such purpose; but these Hymenoptera flit about the walls of sun-dried clay in the outskirts of Cairo, Heliopolis, &c., and also numerously frequent the bakers' shops in the bazaars. After my ascent by the southern staircase to the roof of the time-honoured Temple of Isis at Denderah (anciently Tentyra), on Dec. 24th, 1883, I found myself in a somewhat uncomfortable position, as the summit of the wall was fenced by no parapet and there was a drop of probably thirty feet on the outer, and possibly twenty feet on the inner, side of the wall, and the hornets that were clustered on the patches of clay on the outer wall of the little chapel of Isis on the roof, being disturbed in their depredations by our advance, began to fly wildly about our heads. The said clay cells were the work of the little tawny-coloured bee scientifically known as *Calicodoma sicula*, and they have plastered not only the hieroglyphics, but one whole side of the exterior of the temple. I have three specimens of *V. orientalis* from the cliffs of Lycopolis that I visited on Dec. 22nd, and doubtless the presence of *C. sicula* accounted for their being here also, as on p. 130 of my 'Nine Hundred Miles up the Nile' the following passage occurs:—"Nor must the wonderful labours of hymenopterous insects be left unnoticed that have selected the western side of the cliff as doubtless the most sheltered for their abode, and completely covered it, in one particular spot, with masses of clay cells." Great interest attaches to the fact of the modern traveller finding *V. orientalis* and *C. sicula* side by side, as there can be little doubt but what these are the identical hornet and bee mentioned in Holy Writ. *V. orientalis* was also noticed at Minieh, Upper Egypt, in the outskirts of the town, and around its sugar factory, on Dec. 20th, *cf.* 'Nine Hundred Miles up the Nile,' pp. 120 and 122:—"Hornets were very abundant. Five days only from Christmas and the thermometer is 79° in the sun, and several hornets are settled on the ground outside the mill, to regale themselves on the mingled molasses and water that drips from the waste-pipe." And p. 103, *à propos* of Helwán :—" Hornets are abundant."

In conclusion, the same indefatigable little insect (*Calicodoma sicula*, above mentioned) has covered nearly all the ancient carving of the hieroglyphics on the oldest obelisk in Egypt, that of Heliopolis (which Joseph must often have gazed on, as his father-in-law was priest of its temple), with the coating of its clay cells.—F. A. WALKER, D.D.; Dun Mallard, Cricklewood.

NOTES ON SILK-PRODUCING LEPIDOPTERA.—A pairing of long duration between *Antheræa pernyi*, male (Chinese oak silkworm), and *A. mylitta*, female, of India, took place on May 12th, 1893. On the 13th, 125 eggs were laid during the night, and 91 on May 14th, a total of 216 eggs. After many years' experience, I always found that the pairings of different species of Lepidoptera never had a good result unless the species are closely allied, like *A. pernyi* and *A. rolylei*, or *Platysamia cecropia* with *P. gloveri* or *P. ceanothi*. However, the pairing above mentioned gave me this time a hope that I should be able to rear a hybrid *pernyi-mylitta*, but I was again disappointed. The ova were all fertile, the larvæ became fully developed, but they were unable to cut the shell of the egg. I extracted about two dozen larvæ from the eggs, and all were alive and active. The head of the larva was like that of *pernyi* and the body like that of *mylitta*.

Rhodia fugax. This most interesting Japanese species was bred successfully, and for the first time, in 1895. The ova, which I had received from Japan, began to hatch on May 1st. The larva, which is easy to rear, feeds on various species of *Salix*, and, like *Antheræa yama-maï*, it hybernates in the ovum state. One half of the larvæ (about fifteen) were reared in the house, the others on a sallow in the garden. The larvæ bred in the house commenced their cocoons on July 1st, those bred in the garden about July 15th. A peculiarity of the *fugax* larva is that it squeaks when touched, or even if it is slightly disturbed. The cocoon, which has the same curious form as that of the Indian *R. newara*, is of a most beautiful green.

Hyperchiria janus. During the season of 1895 I received several lots of pupæ of this large Central American species. There were thirty cocoons in the second lot, and I kept them all for the purpose of rearing the larvæ. They arrived on July 5th, and all the moths emerged from July 7th to 14th, the number of females being larger than that of the males. Four or five pairings took place, yet none of the eggs of the various broods hatched, which was a very great disappointment. I am unable to account for this extraordinary and fatal result, the first of the kind I ever had witnessed, as the cocoons and the moths, which were in splendid condition, had not suffered from cold or any other cause, and the greatest care had been taken of the couples. A singular fact also is that the moths, with one exception, laid only a very small number of their eggs.

This year (1898) three Japanese silk-producers are being bred—*Caligula japonica*, *Rhodia fugax*, and *Antheræa yama-maï*. These three species are all in the ovum state during the winter. The eggs all hatched in May.—ALFRED WAILLY; Tudor Villa, Norbiton.

Rusina tenebrosa.—On June 11th I took a partially gynandrous specimen of *Rusina tenebrosa*. All the wings, the body, and right antenna are those of a normal male; but the left antenna and palpi are those of a female: the effect of which is to give the insect a curious "lop-sided" appearance. I took it on a gas-lamp at Winchester, after securing a fine specimen of *Dianthœcia conspersa* on the same lamp.—H. W. Shepheard-Walwyn; West Downs, Winchester.

CAPTURES AND FIELD REPORTS.

Collecting at Northwood, Middlesex.—It may be of interest that *Argynnis euphrosyne* is now on the wing at Northwood, and in fine condition, though not plentiful. Other insects noticed are as follows:—*Pieris brassicæ*, *P. rapæ*, *P. napi*, *Euchloë cardamines*, *Vanessa urticæ* (hybernated), *Lycæna alexis*, *Cœnonympha pamphilus*, *Libellula depressa* (female only).—F. A. Walker, D.D.; Dun Mallard, Cricklewood, N.W., June 7th, 1898.

Amphidasys betularia var. doubledayaria in the London District.—It may be of interest to place on record another instance of the occurrence of the melanic form of *betularia* as far south as East Dulwich, a specimen of the var. *doubledayaria* (female), taken on June 6th by Mr. Eric Arnold, having just been sent to me for identification. The captor, a young entomologist, found his specimen paired with a male of the ordinary form, but unfortunately did not attach any importance to the preservation of the living moth for the purpose of obtaining ova.—H. A. Auld; June 16th.

Fidonia limbaria = conspicuata in Suffolk.—Mr. A. W. Mera informs me that one example of this species was obtained in Suffolk towards the end of May last.—Richard South.

Lepidoptera at Oxshott.—On June 7th *Pleurota bicostella* was far more abundant than usual on the heath, and *Scoparia ambigualis* equally common on tree-trunks. *Tephrosia punctularia* was also plentiful on birch-trunks, and occasionally *Coremia designata*, *C. unidentaria*, *Melanippe sociata*, and *Zonosoma pendularia* were observed on the trees. One example of *Eupisteria obliterata* (=*heparata*) and one of *Zonosoma punctaria* were also obtained. Tortrices, with the exception of *Catoptria ulicetana*, were scarce; the only other species seen were *Eupœcilia nana* (one), *Phoxopteryx uncana* and *Tortrix ministrana*. Larvæ of the pine-feeding *Retinia* were rarely met with, and neither larvæ nor pupæ of *Tortrix piceana* could be detected.—Richard South.

Deilephila livornica at St. Agnes, Scilly.—I have recently received a fine specimen of *D. livornica* from the island of St. Agnes, Scilly, which Mr. G. W. Brown kindly sent me, with the information that he captured it on the lantern of the lighthouse, just before sunrise on May 27th last. He also states in his letter, "I think I saw just such another on the lantern about two years ago." With the exception of a slight rub on the left primary and thorax, hardly noticeable, the specimen is in perfect condition.—F. W. Frohawk; June 18th, 1898.

Vanessa antiopa at Norwich.—A fine specimen of *V. antiopa* was captured just outside this city on Sunday, May 22nd, by Mr. Butler.—R. Laddiman; Norwich.

Field Meeting of the South London Entomological and Natural History Society.—The second field meeting of the season was held on Saturday, June 11th, at Reigate. Sixteen members and two friends left Cannon Street Station by 2.17 train; and on their arrival at Reigate were met by three other members, making the total attendance twenty-one. On leaving the station yard the "Pilgrims Way" was taken to the "Downs," which are reached by a walk of about half a mile; and the afternoon was spent on the portion of the hill-side towards Betchworth. On returning a substantial tea was served at the Railway Hotel; and the homeward railway journey commenced a little before nine o'clock. The weather was all that could be desired for a country ramble, the heat of the brilliant sunshine being tempered by a light northerly breeze; but the predominance of the latter and lack of the former during the preceding week had not been conducive to the capture of a large number of species on even so promising a day. Some fifty species of Lepidoptera were, however, noted. These were as follows:—*Pieris brassicæ*, *P. napi*, *P. rapæ*, *Euchloë cardamines*, *Gonopteryx rhamni*, *Pararge megæra*, *Vanessa cardui ?*, *V. urticæ*, *V. atalanta*, *Cænonympha pamphilus*, *Polyommatus phlœas*, *Thecla rubi*, *Lycæna icarus*, *L. minima*, *L. astrarche*, *L. argiolus*, *L. bellargus*, *Syrichthus malvæ*, *Nisoniades tages*, *Hepialus lupulinus*, *Zygæna filipendulæ* (pupæ), *Setina irrorella*, *Bombyx rubi*, *Euchelia jacobææ*, *Plusia gamma*, *Cucullia verbasci* (larvæ), *Phytometra viridaria*, *Euclidia mi*, *E. glyphica*, *Rumia luteolata*, *Venilia maculata*, *Eupithecia vulgata*, *Acidalia remutata*, *A. ornata*, *A. subsericeata*, *Ematurga atomaria*, *Bapta temerata*, *Melanippe montanata*, *M. rivata*, *M. sociata*, *Camptogramma bilineata*, *Anaitis plagiata*, *Mimæseoptilus phæodactylus* (larvæ), *Scoparia dubitalis*, *Crambus pratellus*, *C. hortuellus*, *C. pascuellus ?*, *Penthina gentiana*. Next field meeting: Chatham, July 9th.

SOCIETIES.

Entomological Society of London.—*June* 1*st*, 1898.—Mr. R. Trimen, F.R.S., President, in the chair. Prof. B. Grassi, M. Hippolyte Lucas, and Dr. August Weismann were elected Honorary Fellows; and Mr. C. H. A. Brooke, of 67, Holland Park Avenue, Kensington, W., and Mr. G. B. Dixon, of St. Peter's Road, Leicester, were elected Ordinary Fellows of the Society. Mr. P. B. Mason exhibited a specimen of the rare *Lathridius filum* from his own herbarium. It had been previously taken at Edinburgh by McNab, and he understood that an example had been found in a sealed envelope containing *Marchantia* from Franz Josef Land. Mr. J. J. Walker exhibited a singular blue variety of *Carabus monilis*, Fabr., resembling in colour *C. intricatus*, and taken at Iwade, Kent, in floor-rubbish in May. Mr. Merrifield forwarded for exhibition from Riva, on the Lago di Garda, larvæ of the "Corsican form," var. *ichnusa* of *Aglais urticæ*. Mr. G. C. Champion called attention to Mr. A. Somerville's recently-published sheet of the County and Vice-county divisions of the British Isles for biological purposes, and a discussion ensued thereon. Papers were communicated by Sir G. F. Hampson, Bart., on "The Moths of the Lesser Antilles," and by Mr. J. H. Leech, on "Lepidoptera-Heterocera from Northern China, Japan, and Korea."—W. F. H. Blandford, *Hon. Sec.*

South London Entomological and Natural History Society.—*May* 26*th*, 1898.—Mr. J. W. Tutt, F.E.S., President, in the chair. Mr. Edwards exhibited a living specimen of a scorpion found by himself in the neighbourhood of Cannes, where it was abundant. It fed readily upon young cockroaches. Mr. West, of Greenwich, a series of the smallest British water-bug, *Microvelia pygmæa*, and stated that it ran readily over the surface of the water. Mr. Turner, a life-history series of *Coleophora genistæcolella* from Carlisle, showing imagines, and cases made by the larvæ on the food-plant, *Genista anglica* (the petty whin). He stated that the larvæ were noticed at Oxshott on May 21st, during the field-meeting.

June 9*th.*—The President in the chair. Mr. Lucas exhibited coloured drawings of *Libellula fulva*, showing details. Mr. Bishop, a bred specimen of *Brephos parthenias*, having a gap in the wing due to an injury to the pupa. The gap was ciliated. He also exhibited specimens of *Thecla rubi*, and remarked on the variability of the androconial marks in this species, while in all the rest of the genus they were notably constant; specimens of *Rumia luteolata*, showing considerable range of variation in the red spotting; and larvæ of *Tæniocampa munda*, *T. incerta*, and *T. stabilis*. Mr. Tutt, ova of *Hepialus lupulinus*, and said that under a glass they looked like little black sloes. Mr. West, of Greenwich, series of the Hemiptera-Heteroptera, *Trapezonotus agrestis* and *Tropistethus holosericeus*, obtained by shaking moss in Headley Lane. Mr. Shortridge Clarke gave an account of a remarkable occurrence of thousands of larvæ and imagines of *Caradrina quadripunctata* (*cubicularis*) in a large hay-store in the Isle of Man.—Hy. J. Turner, *Hon. Rep. Sec.*

Birmingham Entomological Society.—*May* 16*th*, 1898.—Mr. G. T. Bethune-Baker, President, in the chair. Mr. R. C. Bradley showed a Trypetid taken on a window in his house at Sutton; it had been seen by Mr. G. H. Verrall, who said it was *Rhacochlæna toxoneura*, a genus and species new to Britain and very rare. Mr. P. W. Abbott, *Tæniocampa opima* and a series of *T. stabilis*, in which the orbicular and reniform tend to coalesce; in one specimen they do coalesce on the right wing but not quite on the left; all from Wyre Forest. Mr. G. T. Bethune-Baker, the remainder of his collection of the genus *Colias*, also *Megastoma* and *Rhodocera;* and pointed out the manner in which *Colias* ran naturally into *Rhodocera* through *Megastoma*. *M. centralamericana* has a hook tip, but is still like *Colias; M. eurydice* is very like *centralamericana* in the male, but the female is like *Rhodocera rhamni*, pale with a good hook tip.—Colbran J. Wainwright, *Hon. Sec.*

OBITUARY.

It is with much regret that we have to record the death of the following distinguished Entomologists.

Joseph Albert Lintner.—Dr. Lintner, State Entomologist, New York, died in Rome on the 5th of May last, at the age of seventy-six. He was the son of a Lutheran clergyman, and was born at Schoharie in New York State. He had to make his own way in the world; and for thirty-one years pursued a mercantile career. Meanwhile, however, he was devoting his leisure moments to the more congenial occupation of the study of natural science, and especially of entomology. In 1868 he became Curator of the New York State Museum; and in 1880 the office of State Entomologist was created, and he was offered and accepted the appointment, which he held until his death. He was entomological editor of the 'Country Gentleman' newspaper; Fellow of many Learned and Scientific Societies both in America and Europe; President of the Department of Natural Science in Albany Institute, New York, since 1879; President of the Entomological Club and of the Association for the Advancement of Science. His mercantile career naturally equipped him for the economic side of entomology, which his State office required; and in making scientific research of actual and practical value he was eminently successful. His Twelfth Report has just been issued, and gives a fresh illustration of the practical nature of his work. New York State has been fortunate in having for its official entomologist not only a man of high acquirements and of wide and liberal views, but one whose sympathies were with the farmers, gardeners, and fruit-growers in their struggles against injurious insects. He had been looking forward to his tour in Europe as giving opportunity of making personal acquaintance with many entomological colleagues. He spared no pains in communicating his great knowledge to all pursuing any special subject who sought his aid. He was never known to give offence; never was an unkind word said by him or of him. Always ready to encourage the work of others not occupying so high a position as himself and to stamp what was sound and good with his authoritative approval, determined also that the original worker should have credit for his work, his removal by death will be deplored by all who have been brought into contact with him.

Osbert Salvin.—Mr. Salvin died on June 1st last, at his residence, Hawksfold, near Haslemere. The second and only surviving son of the late Mr. Anthony Salvin, the well-known architect, he was born in 1835, and received his education at Westminster and Trinity Hall, Cambridge, whence he graduated as a Senior Optime in the Mathematical Tripos of 1857. Immediately after taking his degree he, together with Mr. W. H. Hudleston (then Simpson), joined Mr. (now Canon) Tristram in his natural history exploration of Tunis and Eastern Algeria, where they passed five months. In the autumn of the same year Mr. Salvin proceeded to Guatemala, where, chiefly in company with the late Mr. G. U. Skinner, the celebrated collector of orchids, he stayed till the middle of 1858, returning to Central America (henceforth always to be associated with his name) about twelve months later. He again went out in 1861, accompanied by Mr. Frederick Godman, and continued the explorations he had already begun; but was home again in 1863. In 1865 he married Caroline, the daughter of Mr. W. W. Maitland, of Loughton in Essex, and with her subsequently undertook another voyage to Central America. In 1874, on the foundation of the Strickland Curatorship in the University of Cambridge, he accepted that office, which he filled until 1883, when, on his father's death, he succeeded to the property at Hawksfold, and moved thither, though there was hardly a week in which he did not pass some days in London; for, with Mr. Godman, he had conceived the idea of bringing out a 'Biologia Centrali-Americana,' being a complete natural history of the countries lying between Mexico and the Isthmus of Panama. This gigantic task, by far the greatest work of the kind ever attempted, taxed all their united efforts and those of the many contributors they enlisted, and is still in progress. Before beginning this, Mr. Salvin had edited the third series of 'The Ibis,' of which he was one of the founders; and had brought out a 'Catalogue of the Strickland Collection' in the Cambridge Museum. He contributed also the Trochilidæ (humming-birds) and Procellariidæ (petrels)—on which last group he was the acknowledged authority—to the British Museum 'Catalogue of Birds'; and almost his latest labour was that of completing and arranging the late Lord Lilford's 'Coloured Figures of British Birds'; while the Royal Society's 'Catalogue of Scientific Papers' enumerates forty-seven published by Mr. Salvin alone, twenty-three by him and Mr. Godman jointly, and fifty-four by him and Mr. Sclater—all before 1884. Mr. Salvin was a Fellow of the Royal, the Linnean, the Zoological, and the Entomological Societies, on the councils of all of which he frequently served; and it may be truly said that there were few naturalists whose opinion was more often sought, for his advice was generally sound. His figure was well known at the Athenæum Club; and last year he was elected an Hon. Fellow of his old college. He will be greatly missed by a large circle of friends, to whom his quiet and unassuming manners greatly endeared him.

William Miles Maskell.—Mr. W. M. Maskell, Registrar of the New Zealand University, died on May 1st, aged fifty-eight years. He was born in Hampshire, England, and was educated at the Catholic College of St. Mary, Oscott, and also in Paris. After leaving school he entered the army, and served for three years in the 11th Infantry, now known as the Devonshire Regiment. He went out to New Zealand in 1860 in the ship 'William Miles,' and landed at Lyttelton the same year. In Canterbury he worked for some time on sheep stations until, having gained sufficient experience, he took up a sheep run on his own account in Kaikoura in the Marlborough district. In 1864 he returned to Canterbury; and for the eight years following he was farming at Sefton. He was elected a member of the Privy Council in 1865 and kept his seat until 1875, when the General Assembly took over the reins of Government. In 1874 he was appointed Provincial Secretary and Treasurer of Canterbury; the Hon. J. T. Peacock being at the same time Secretary for Public Works. Mr. Maskell was appointed in succession to Mr. E. Jolly, who at that time represented Selwyn. On the formation of the New Zealand University he was appointed Registrar, and during the time that the Hon. J. Tancred held the position of Chancellor he resided in Christchurch; but when Sir James Hector assumed the Chancellorship Mr. Maskell went to Wellington, where he has lived ever since. Mr. Maskell was a widely-read man, who took keen interest in scientific matters. He was a prominent member of the Philosophical Institute both in Christchurch and Wellington, and in fact assisted in the foundation of the Institute. He was well known as an entomologist; and some of his papers on Coccidæ, of which family he was recognised an authority, were widely published.

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A GUIDE TO THE STUDY OF BRITISH WATERBUGS (AQUATIC RHYNCHOTA).

By G. W. Kirkaldy.

The study of British waterbugs has been much neglected, even by those entomologists who have given a certain amount of attention to the land-inhabiting species, and it has been suggested to me by our editor that a few introductory remarks upon their collection and preservation, upon some salient points in their structure, and upon their metamorphoses and habits, may be of interest to British collectors.

Collecting, &c.

The apparatus required is simple, *viz.* a net, a killing-bottle, forceps, some glass tubes and small tin boxes, a pocket-magnifier, a piece of rag, and various odds and ends that experience will dictate from time to time. The net should be of good stout material (of sufficiently wide mesh to allow the water to escape readily, while retaining such small insects as *Micronecta* (*Sigara*) and *Plea*), not too long, with the bottom rounded off at the corners; this last point is important. The frame of the net should be strong; I myself use a "salmon landing-net" ring, jointed in three places, so that when the net is removed and squeezed dry, the ring (which is, during use, screwed into a strong stick) can be folded and placed in the satchel or bag when starting for home. Care should be taken to wipe the ring and stick-socket quite dry before packing.

The long-legged "pondskaters" (Hydrometridæ) may be captured by a quick stroke of the net, scarcely entering the water at all. *Velia* and some species of *Gerris* are generally found on little inlets of water close to a running stream, or on the stream itself, though occasionally straying on to stagnant water, where are found the other species of *Gerris*, *Hydrometra*, &c. In fairly clear ponds *Notonecta*, *Ilyocoris* (*Naucoris*), and *Corixa* can be seen swimming below, and at times ascending to the surface for air, but as a rule one has to trust to a thorough "sweeping" of the water for these insects. In sweeping a very weedy pond (especially one infested with the Canadian pond weed, *Elodea canadensis*, formerly called *Anacharis canadensis*), the contents of the net should be turned out upon a piece of white mackintosh (or similar substance). The weed should then be shaken and discerpted piece by piece in some water in a small portable white-bottomed dish, a number of small bugs (*Plea*, *Micronecta*, &c.) being thus taken, which might otherwise escape notice from being concealed in a mass of weeds, or imprisoned between two or more leaves which have adhered in consequence of the removal of the plant from the pond.

Nepa and *Ranatra* watch for their prey resting on the bottom of the pond, concealed in mud; the collector should therefore place the net close to a large plant or mass of smaller plants, about an inch beneath the surface of the mud, and with a swift twisting movement draw it to the surface. The net should then be filled with water and shaken, the water filtering through the meshes and carrying with it the finer particles of mud. When this has been repeated several times, most of the mud will have escaped, and the contents of the net will now be ready for examination.

Waterbugs may be searched for in swift running streams and in small stagnant ponds, while one or two species of *Corixa* are scarcely found elsewhere than in brackish dykes near the sea; small ponds, however, harbouring but few weeds, and with a perpetual bottom of decaying oak, elm, or beech leaves, I have not found productive. It is in these places that the crustacean *Asellus* is to be found in "herds," and I always accept their presence in large quantities as an indication of the absence of waterbugs. Moreover, the latter are unlikely to occur in ponds infested with frogspawn, and their condition upon extraction from a mass of weeds and watersnails, enveloped in the spawn, is not very satisfactory.

One small species, *Aëpophilus bonnairii* (whose exact systematic position is doubtful), has been discovered at various seaside localities in England and Ireland (but not, I think, in Scotland) under stones and in fissures of rock not far above low water.

As a rule, waterbugs have a wide distribution. Some species of *Gerris* and *Corixa*, however, are found only in the elevated portions of Scotland, though occasional stragglers occur in the south; one species—*Corixa caledonica* (*cognata*)—is known to science only from Scotland, though distributed there from Loch

Leven to the Shetlands. Collectors, especially those residing in North and West Scotland, in West Ireland, and in Wales, will do well to study the waterbugs of their neighbourhood, as no doubt such examination will extend our knowledge of the distribution of a number of rare species, and add new species to our fauna, and possibly to science.

One great advantage which the student of aquatic Rhynchota possesses over collectors of (for example) Lepidoptera is that weather should make little difference to him. Should he be so minded, he may sally forth during pouring showers or on a dull cloud-obscured day, and find little or no diminution in the number and quality of his captures. Collecting may be done, moreover, all the year round. Hydrometridæ appear to hybernate in the perfect state; the imagines being found from August to June, the larvæ from about May to August. *Micronecta* hybernates in the larval state (according to Buchanan White), but I have never found it then. All the other waterbugs passing the winter fully developed, they may be looked for in the latter state from about the end of July to the beginning of June, or even later. The ova are deposited in April or May, as a rule, and the various larval stages are passed through from May to the end of July; but all these dates overlap and vary considerably from year to year. April, May, August, and September are perhaps the most productive and the most pleasant months in which to collect, although certain species are more abundant in the earlier months of the year. *Notonecta*, *Corixa*, &c., may be seen during the winter frozen and huddled together in masses under the ice; whilst Hydrometridæ pass the same season under moss or stones, often some distance from water. Waterbugs are by no means of a solitary disposition (except perhaps the Nepidæ), but usually occur together in some numbers,—several species of *Corixa* appearing to move in small shoals; so that when the collector finds, either at the collecting-place or during a more careful examination subsequently, that he has chanced upon a rare or local species, he may work the same locality again, with very good hopes of success.

With the exception of the Nepidæ, which are exceedingly prone to die in captivity, waterbugs are very easily kept in aquaria, provided that reasonable care be taken. Unless, however, an abundance of suitable food is provided, they will feed upon each other. Separate aquaria (fair-sized jam jars answer the purpose very well) should be kept for the propagation of entomostracous crustacea (*Cyclops*, *Daphnia*, &c.) for the nourishment of Corixidæ and the small larvæ of the larger species; while *Notonecta* and the other large species should be *well* supplied with larvæ of Ephemeridæ, *Sialis*, small fishes, &c. Hydrometridæ will feed upon flies or small pieces of raw meat.

Having captured the insects, a killing-bottle is our next thought for those which we do not wish to retain for the aquarium. The most convenient, despite its many defects, is the "cyanide" bottle. The floor of the bottle should be furnished with a thick closely cut pad of blotting-paper, and the sides should be similarly provided.

The captures may, if preferred, be brought home alive and then killed by *momentary* immersion in *boiling* water.

The specimens intended for the aquarium should NOT be brought home in jars full of water, but should be packed, sufficiently tightly, with plenty of weed in small tin boxes (without added water), when they will travel very well for moderate distances.

(To be continued.)

SOME CHANGES IN THE NOMENCLATURE AND ARRANGEMENT OF BRITISH LEPIDOPTERA-HETEROCERA.

(Continued from p. 162.)

HEPIALIDÆ.

Hampson places this family between Psychidæ and Drepanulidæ, but remarks in a footnote that if the Heterocera could be arranged in a linear series, the Hepialidæ would immediately precede the Micropterygidæ; and in this he is in agreement with Meyrick, who so places the family in his division MICROPTERYGINA. In Kirby's arrangement it is the last family included in 'Sphinges and Bombyces.'

HEPIALUS VELLEDA, Hübn.—Kirby sinks *velleda* as a synonym of *H. fusconebulosus*, Retz. (Gen. Spec. Ins. p. 44 (1783)).

COSSIDÆ (ZEUZERIDÆ, Kirby).

Hampson states that in a linear arrangement this family would follow the *Alavona* section of the Tineidæ.

COSSUS LIGNIPERDA, Fabr.—Kirby retains the specific name *cossus*, Linn., for this species, and gives it as the type of *Trypanus*, Ramb., Cat. Lép. And. ii. p. 326 (1866). Meyrick adopts this, and places the family, Trypanidæ, at the end of his division TORTRICINA.

MACROGASTER CASTANEÆ, Hübn.—Both Kirby and Hampson adopt the genus *Phragmatœcia*, Newm., for this species, although it is later than *Macrogaster*, Dup.; but the latter name had been previously used. Meyrick agrees in this, but places the family Zeuzeridæ in his division PSYCHINA.

COCHLIOPODIDÆ (LIMACODIDÆ, Kirby).

HETEROGENEA LIMACODES, Hufn., and H. ASELLA, Schiff.—The latter species is the type of *Heterogenea*, Knoch, according to Kirby, who changes the specific name to *cruciata*, Knoch. The same author sinks *limacodes*, Hufn., as a synonym of *avellana*, Linn., and indicates it as the type of *Apoda*, Haworth. Meyrick employs both genera in the same sense as Kirby, but adopts Heterogeneidæ as the name of the family which he refers to his division PSYCHINA.

LIPARIDÆ (LYMANTRIIDÆ, Hampson).

PORTHESIA SIMILIS, Fuessl.—Kirby indicates this species as the type of *Leucoma*, Hübn. (Tentamen. p. 1), but Hampson and Meyrick adopt *Porthesia*, Stephens.

PORTHESIA CHRYSORRHŒA, Linn.—The type of *Euproctis*, Hübn., a very widely-distributed genus.

LEUCOMA SALICIS, Linn.—The type of *Stilpnotia*, West. and Humphr.

OCNERIA DISPAR, Linn.—The type of *Porthetria*, Hübn., according to Kirby. Hampson sinks this genus in *Lymantria*, Hübn., whilst Meyrick refers *dispar* to *Ocneria*, Hübn.

PSILURA MONACHA, Linn.—The type of *Lymantria*, Hübn. Meyrick includes this species in *Ocneria*, Hübn.

DASYCHIRA FASCELINA, Linn., and D. PUDIBUNDA, Linn.—According to Kirby *fascelina*, Linn., is the type of *Orgyia*, Ochs., and *pudibunda* the type of *Dasychira*, Hübn., but Hampson gives *antiqua*, Linn., as the type of the first-named genus. Meyrick places both species under *Dasychira*, Hübn.

ORGYIA ANTIQUA, Linn., and O. GONOSTIGMA, Fb. (Linn., *teste* Kirby). — These species are referred by Kirby to *Notolophus*, Germ. (Syst. Gloss. Prodr. p. 35 (1812), and he indicates *antiqua*, Linn., as the type of the genus. Hampson includes *Notolophus*, Germ., in *Orgyia*, Ochs., and Meyrick employs the last named for both species.

BOMBYCIDÆ (LASIOCAMPIDÆ, Hampson and Kirby).

ERIOGASTER LANESTRIS, Linn.—The type of *Eriogaster*, Germ. (Prod. Syst. Lep. p. 6 (1811).

BOMBYX NEUSTRIA, Linn., and B. CASTRENSIS, Linn.—The last-named species is the type of *Clisiocampa*, Stephens, and *neustria* is referable to the same genus.

BOMBYX RUBI, Linn.—Kirby gives this as the type of *Macrothylacia*, Ramb. (Cat. Lép. And. ii. p. 358 (1866). The only other species included in the genus is *M. psidii*, Sallé, from Mexico and Central America. Meyrick places *rubi*, Linn., in *Eriogaster*, Germ.

BOMBYX QUERCUS, Linn., and B. TRIFOLII, Esp.—Kirby refers both these species to *Lasiocampa*, Schrank. (Fauna Boica, ii. (2) pp. 147, 154 (1802), and indicates the first named as the type of the genus. Ten named forms of *quercus* and seven of *trifolii* are enumerated. Meyrick also adopts *Lasiocampa*.

ODONESTIS POTATORIA, Linn.—Hampson retains this species as the type of *Odonestis*, Germar, but Kirby considers *Bombyx pruni*, Linn., to be the type of that genus, and refers *potatoria* to *Philudoria*, Kirby = *Odonestis*, Steph. & Walk.

LASIOCAMPA QUERCIFOLIA, Linn., and L. ILICIFOLIA, Linn.—The first named is the type of *Gastropacha*, Ochs. Kirby refers *ilicifolia* to *Phyllodesma*, Hübn., of which genus he indicates *Las. suberifolia*, Dup., as the type.

ENDROMIIDÆ.

Kirby includes *Endromis versicolor*, Linn., in Bombycidæ, and it is the only representative of the family, as now restricted, occurring in Britain. If Hampson, however, is followed, and Endromiidæ allowed to rank as a separate family, we have no example of Bombycidæ in this country, or even in Europe, unless we count *B. mori*, Linn., which is the type of the genus *Bombyx*, Linn., and which, I believe, occurs in a semi-wild state in the South of Europe. Meyrick refers the family (Endromididæ) to his division LASIOCAMPINA, in which he also includes "Drepanidæ."

DREPANULIDÆ.

DREPANA, Schrank, = PLATYPTERYX, Laspeyres.—Hampson gives *falcataria*, Linn., as the type of *Drepana*, Schr., but Kirby includes this species together with *harpagula*, Esp., *cultraria*, Fab., and *binaria*, Hufn., in *Platypteryx*, Lasp., and indicates the latter species as the type of the genus. The type of *Drepana*, according to Kirby, is *glaucata*, Scop. (*spinula*, Schiff.), which most authors, including Hampson, consider to be the type of *Cilix*, Leach. *Falcaria*, Haworth (Lep. Brit. ii. pp. 147, 152 (1809), is adopted by Kirby and Meyrick for *lacertinaria*, Linn.; and the last-named author also includes *falcataria*, Linn., in Haworth's genus, whilst he refers *harpagula*, *binaria*, and *cultraria* to *Drepana*, Schr.

DICRANURIDÆ (NOTODONTIDÆ, Hampson and Kirby).

DICRANURA, Latreille, = CERURA, Schrank.—Hampson gives *vinula*, Linn., as the type of *Dicranura*, Boisd. (Latr.), and *furcula*, Schr., as the type of *Cerura*, Schr., = *Harpyia*, Ochs. Kirby merges *Harpyia* and *Dicranura* in *Cerura*, but does not indicate the type. He sinks *bifida*, Hübn., as a synonym of *hermelina*, Goeze (Beytr. Ins. iii. (3), p. 277 (1781), and refers *bicuspis*, Steph., and *latifascia*, Curt., to *C. lanigera*, Butl., instead of to *furcula*, Linn., of which species the insect figured by Stephens and that described by Curtis are, by some entomologists, considered to be forms. *C. lanigera* is from Japan, and may be a distinct species, but possibly it is only a local form of *C. bifida* = *hermelina*.

NOTODONTIDÆ.

LOPHOPTERYX CAMELINA, Linn., L. CUCULLA, Esp., and L. CARMELITA, Esp.—The first named is the type of the geuus, but Kirby changes the name to *L. capucina*, Linn.; *L. cucullа*, Esp., he also changes to *L. cucullina*, Den. and Schiff.; and *carmelita* he removes, as the type of the genus, to *Odontosia*, Hübn. Meyrick adopts the latter genus for all three species, but does not change the specific names.

NOTODONTA BICOLOR, Hübn.—Kirby places this species as *bicoloria*, Den. and Schiff., in *Microdonta*, Duponchel; but as this name is preoccupied in Coleoptera, Staudinger changes it to *Leucodonta* and Meyrick to *Hierophanta*.

NOTODONTA DICTÆA, Linn., and N. DICTÆOIDES, Esp.—Changed respectively by Kirby to *Pheosia tremula*, Clerck., and *Pheosia gnoma*, Fabr., the first named being indicated as the type of *Pheosia*, Hübn.,=*Leiocampa*, Steph. Hampson also gives *dictæa*, Linn., as the type of *Pheosia*, Hübn., in which he merges *Hoplitis*, Hübn.—Type *milhauseri*, Fabr.

NOTODONTA DROMEDARIUS, Linn.—The type of *Notodonta*, Ochs.,=*Peridea*, Steph. The following are also included in this genus: *N. ziczac*, Linn., *N. trilophus* (*tritophus*), Fab., Esp. (fig. 3), *N. trepida*, Esp., and *N. torva*, Hübn. Kirby sinks *tritophus* (*trilophus*) in *N. phœbe*, Scriba (Beitr. Ins. p. 18, pl. 2, figs. 1, 2 (1770); merges *trepida* in *N. anceps*, Goeze (Beytr. Ins. iii. 3, p. 207 (1781); and revives *tritophus*, Esp. (Schmett. iii. p. 299, pl. 60, figs. 1, 2, *nec* fig. 3 (1786), for *torva*, Hübn. (*Bomb.*, text, p. 108 (1800).

NOTODONTA CHAONIA, Hübn., and N. TRIMACULA, Esp.—The last named is the type of *Drymonia*, Hübn.,=*Chaonia*, Steph., according to Kirby, who also includes *chaonia* in the genus, but sinks it in *D. ruficornis*, Hufn. (Berl. Mag. ii. p. 424 (1766). The species placed by Stephens in his genus *Chaonia* are *roboris*, Fabr., = *chaonia*, Hübn. (Ent. Syn. List) = *ruficornis*, Hufn. (Kirby); and *dodonea*, Wien. Verz., = *trimacula*, Esp. (E. S. L.). Meyrick includes these species, and also *dictæoides*, *dictæa* (*tremula*), and *trepida* in *Drymonia*.

Pygæridæ (Notodontidæ, Kirby and Hampson).

Pygæra (Clostera) curtula, Linn., P. anachoreta, Fabr., and P. pigra, Hufn.—Kirby includes all these in *Melalopha*, Hübn. (Tent. p. 1 (1810), and indicates *curtula* as the type. Hampson places *anachoreta* in *Ichthyura*, Hübn. (Verz. p. 162 (1816), with *anastomosis*, Linn., as the type. Meyrick places all three species under *Pygæra*, Ochs. Only two species are recognised by Kirby as properly belonging to *Pygæra*, Ochs. (Schmett. Eur. iii. p. 224 (1810); these are *P. timon*, Hübn. (type), and *P. timonides*, Brem., but neither are British insects.

ARRANGEMENT OF FAMILIES

According to Kirby, Hampson, and Meyrick.

SPHINGES and BOMBYCES.

Kirby (Cat. Lep. Het. vol. i.).

NO. OF FAM.
7. Zygænidæ.
8. Arctiidæ.
9. Cymbidæ.
10. Lithosiidæ.
16. Liparidæ.

NO. OF FAM.
18. Psychidæ.
19. Limacodidæ.
20. Notodontidæ.
21. Sphingidæ.
22. Bombycidæ.

NO. OF FAM.
23. Drepanulidæ.
25. Saturniidæ.
26. Lasiocampidæ.
28. Zeuzeridæ.
29. Hepialidæ.

Hampson (Fauna, Brit. Ind. Moths).

NO. OF FAM.
1. Saturniidæ.
Endromiidæ.
(Would come here, but is not represented in India.)
5. Sphingidæ.
6. Notodontidæ.

NO. OF FAM.
7. Cymatophoridæ.
(Not included by Kirby.)
8. Sesiidæ.
11. Zygænidæ.
12. Psychidæ.
13. Cossidæ.

NO. OF FAM.
15. Hepialidæ.
17. Drepanulidæ.
19. Limacodidæ.
20. Lasiocampidæ.
22. Lymantriidæ.
24. Arctiidæ.

Meyrick (Hand. Brit. Lep.).

NO. OF FAM.
1. Arctiadæ.
4. Ocneriadæ.
10. Polyplocidæ (= Cymatophoridæ).
11. Sphingidæ.
12. Notodontidæ.

NO. OF FAM.
13. Saturniadæ.
14. Drepanidæ.
15. Endromididæ.
16. Lasiocampidæ.
31. Psychidæ.
32. Zeuzeridæ.

NO. OF FAM.
33. Zygænidæ.
34. Heterogeneidæ.
38. Trypanidæ.
39. Ægeriadæ.
45. Hepialidæ.

(To be continued.)

THE NORTH AMERICAN BEES OF THE GENUS *PROSAPIS*.

By T. D. A. Cockerell, N. M. Agr. Exp. Sta.

The genus *Prosapis* (or *Prosopis*) consists of small bees with almost naked bodies, more resembling the Pemphredonidæ in appearance than their allies among the Andrenidæ. 265 species are known, the genus being of world-wide distribution. Our species never exhibit metallic colours, but some from Australia (e. g. *P. cognata*, Sm., *P. purpurata*, Sm.) show blue and purple. In certain species the base of the abdomen is ferruginous; this is the case with our own *P. nelumbonis*, Rob., and *P. flammipes*, Rob., from the Eastern U. S. (Illinois, Florida), but it is not observed in any of those found west of the Mississippi. The red base of the abdomen reappears, however, in the Sandwich Islands species, *P. hilaris*, Sm., and *P. volatilis*, Sm. The extreme development of the red is reached in the Australian *P. rubricata*, Sm., which is red with yellow markings, the scutellum, metathorax, pectus, and legs black.

Several species found in Mexico show more or less yellow on the scutellum, a character not seen in those inhabiting the United States. This fact is interesting, because in *Perdita* a Mexican species (*P. mexicanorum*, Ckll.) has a yellow postscutellum, while all of the United States species have this part dark.

The sexes differ considerably in the markings, and the males present the best distinctive characters. The following table may be used to distinguish the known North American species in that sex:—

Males.

1. Supra-clypeal mark entirely absent . *nevadensis;* also *schwarzii.*
2. Supra-clypeal mark present . . . . . . 3.
3. Scutellum with more or less yellow; species of Mexico . . . . 4.
   Scutellum without any yellow . . . . . 7.
4. Abdomen with two entire narrow white bands . 5.
   Abdomen without entire white bands . . . . 6.
5. Markings white; 2nd segment of abdomen very coarsely punctured . . . . *grossa.*
   Markings yellow; 2nd segment of abdomen more finely punctured . . . . *maculipennis.*
6. Abdomen very minutely sculptured . . . . *dubiosa.*
   Abdomen with 1st segment presenting large deep punctures . . . . *mexicana.*
7. Large species with the scape heart-shaped, half light, half dark, and the tubercles wholly dark; lateral face-marks broadly triangular . . . *basalis.*
   Not so . . . . 8.

8.	Lateral face-marks above receding from or not approaching orbital margin	9.
	Lateral face-marks above continuous along orbital margin	22.
9.	Lateral face-marks ending above in a broad oblique truncation; scape dilated, light in front	10.
	Lateral face-marks ending narrowly or in a knob	11.
10.	Face-marks white	*antennata.*
	Face-marks lemon-yellow	*varifrons.*
11.	Tubercles wholly dark; upward prolongation of lateral face-marks entirely separate from orbital margin, narrow and not swollen at end	12.
	Tubercles partly light	13.
12.	Lateral face-marks not filling space between clypeus and orbit	*saniculæ.*
	Lateral face-marks filling space between clypeus and orbit	12*a*.
12*a*.	Mesothorax pubescent, wings tinged greyish	*subdigitata.*
	Mesothorax naked, wings tinged brownish	*digitata.*
13.	Upward extension of lateral face-marks wholly away from orbital margin, ending in a large knob curving over antennæ; scape light in front	*bakeri.*
	Upward extension of face-marks not ending in a large knob curving over antennæ	14.
14.	Upward extension of face-marks wholly separated from orbital margin, even at the base	15.
	Upward extension of face-marks curving away from orbital margin at the base	16.
15.	Wings clear or not brownish, face yellow	*rudbeckiæ.*
	Wings brownish tinged, face yellowish white	*ruidosensis.*
16.	Tibiæ and tarsi wholly reddish orange	*labiatifrons.*
	Not so	17.
17.	Supra-clypeal mark much longer than broad	18.
	Supra-clypeal mark not or hardly longer than broad	*fallax.*
18.	Small species, with the upward extension of lateral face-marks diverging from orbit but itself little curved, and not greatly prolonged	19.
	Larger species, with the upward extension of lateral face-marks narrow and curved	20.
19.	Upward extension of lateral face-marks rapidly diverging from orbit	*pygmæa.*
	Upward extension of lateral face-marks slowly diverging from orbit	*mesillæ.*
20.	First abdominal segment smooth; end of lateral face-marks above on a smooth shining space	*verticalis.*
	First abdominal segment punctured	21.
21.	Somewhat larger, face broader, face-marks creamy white	*tridens.*
	Somewhat smaller, face narrower, face-marks strongly yellow	*tridentula.*
22.	Supra-clypeal mark broad and short, but little longer than broad	24.

Supra-clypeal mark broad but tapering above, like a bishop's mitre . . . . 22*a*.
Supra-clypeal mark small and narrow . . . . 23.
Supra-clypeal mark an elongated triangle . . *triangularis*.
22*a*. Wings clear . . . . *coquillettii*.
Wings more or less darkened . . . . . 22*b*.
22*b*. Larger, scape with only a light streak, face not much narrowed below . . . . . *episcopalis*.
Like the last, but smaller, scape all dark, face yellow, hind tibiæ wholly yellow . . . *illinoensis*.
Smaller than *episcopalis*, half of scape light, face much narrowed below . . . . . *georgica*.
23. Lateral face-marks very broad; face broad below . *coloradensis*.
Lateral face-marks narrow; face much narrowed below . . . . *asinina*.
24. Lateral face-marks not tapering to upper end, but broadly truncate . . . . 25.
Lateral face-marks tapering to upper end, pointed or very narrowly truncate . . . . . . 27.
25. Dorsal punctuation of 1st and 2nd abdominal segments very distinct; punctuation of mesothorax relatively coarse . . . . . . *rugosula*.
Dorsal punctuation of 1st and 2nd abdominal segments extremely fine or almost wanting . . 26.
26. Markings bright lemon-yellow; apex of supra-clypeal mark minutely notched . . . . *ziziæ*.
27. Dorsal punctuation of 1st abdominal segment indistinct or wanting . . . . . . *modesta*.
Dorsal punctuation of 1st abdominal segment quite distinct . . . . 28.
28. Face-markings white or cream-colour, orbits strongly converging below . . . . 29.
Orbits little or not converging below . . . 28*a*.
28*a*. Face-markings buff; large species, tubercles dark, wings fuliginous . . . . . . *suffusa*.
Face-markings bright lemon-yellow . . . *citrinifrons*.
Very like the last, rather smaller; face-markings orange, lateral marks differently shaped . . *pennsylvanica*.
29. Tegulæ wholly dark . . . . . . *wootoni*.
Tegulæ with a light spot . . . . . *divergens*.

P. affinis, Smith, and *P. modesta*, Say. — Mr. Robertson formerly published the opinion that these were identical. I found I had two species from the Eastern U. S., to which I applied these names, and accordingly wrote him about the matter. He replied that he also had arrived at the conclusion that there were two species concerned, and shortly afterwards he published the distinctive characters in Canad. Entom. May, 1896. His two species are the same as mine, but what he calls *affinis* I had called *modesta*, and *vice versâ*. He further declares that Say's supposed male of *modesta* is really *pygmæa*, and suggests that Smith's supposed male of *affinis* does not belong to it. The fact is, the original descriptions of both *modesta* and *affinis* are such that it is little better than guesswork to identify the species described. Mr. Robertson, feeling this, goes so far as to propose the alternative name *ziziæ* for the supposed *affinis*, and until we can have a better description of the latter, from Smith's type, it will be preferable, I think, to call the insect *ziziæ*, Rob. *P. modesta* may remain as identified by Robertson; I have found it larger than *ziziæ*, though Robertson gives the same dimensions.

GEOGRAPHICAL DISTRIBUTION.

When studying the genus *Perdita*, I was fortunate in having exact data concerning the localities and habits of most of the species. With *Prosapis*, which is distributed all over the continent, and presents few species in New Mexico, the case has been entirely different. Consequently the difficulty of correctly associating the sexes, and in many cases of determining the status of slightly-differing forms, has been very great, so that the attempt was almost abandoned. The most useful method for clearing up the difficulties alluded to is probably to consider separately the species seen from each State or territory.

ILLINOIS.—Thanks to Mr. Robertson, we are well acquainted with the species of this State, which are not numerous, viz. *ziziæ*, Rob., *modesta*, Say, *pygmæa*, Cress., *saniculæ*, Rob., *illinoensis*, Rob., and *nelumbonis*, Rob. The first three seem to be much commoner than the others. Dr. W. A. Nason sent me a large series of specimens which he had collected at Algonquin, Ill.; they include *ziziæ*, *modesta*, *pygmæa*, and a single *nelumbonis*.

IOWA.—One specimen of *P. saniculæ* has been seen. (Coll. Amer. Ent. Soc.)

SOUTH DAKOTA.—*P. ziziæ*, race *dunningi*, nov. One male, Volga, S. D., sent by Mr. S. N. Dunning. Length, 5½ mm. Differs from *ziziæ* by the dullish and quite strongly punctured first segment of abdomen, the somewhat more dusky wings, the supra-clypeal mark long, nearly as in *illinoensis*, not notched at tip, the lateral face-marks broadened and squarely truncate at ends (not rounded or obliquely truncate), the face a trifle broader. The mandibles are strongly bifid at tips, as in *ziziæ*. From *illinoensis* it differs at once by the punctured first abdominal segment, the yellow stripe on scape, and the partly black hind tibiæ. From *rugosula* it differs by the more slender and curved scape, with a yellow stripe, the lateral face-marks broader at their ends, the flagellum distinctly pallid beneath, the yellow on hind border of prothorax, and the smaller abdominal punctures.

Whether this should be considered a distinct species may only be determined when large collections of *Prosapis* are made in South Dakota and adjacent regions. It is in any event an interesting form, as it connects the Rocky Mountain types, with the first abdominal segment strongly punctured, with those of the east, in which that part is smooth or feebly punctured. The indications are that South Dakota may be a meeting-ground between the eastern and western types of bees, but unfortunately we know hardly anything of its bee-fauna.

The Coll. Amer. Ent. Soc. contains two female *Prosapis* from S. Dakota, one of them from Brookings.

PENNSYLVANIA.—A male sent by Mr. Baker differs from Illinois *modesta* in being somewhat smaller, with a narrower face, and less black on the hind tibiæ. But I assume that it is the same species. The U. S. N. M. contains *P. pennsylvanica*, from Montgomery Co. Of females from Pa. I have only *modesta*, sent by Mr. Baker; they agree with those from Illinois.

Mr. Dunning sends a male *P. varifrons*, a boreal type, from Tioga Co. (A. M. Warren).

NEW JERSEY.—The U. S. N. M. contains four examples from Camden Co., May 18th, 1890; one bears Mr. Fox's name. One is a male *pygmæa;* two are male *modesta;* the fourth, also a male, may belong to *confluens*, Smith, of which only the female is known. It is nearest to *ziziæ*, but the wings are hyaline at the base, and quite strongly dusky beyond the first discoidal cell (as Smith says of *confluens*), the thoracic punctures are very large and frequently confluent, the face is broader, and more of an orange-yellow, the lateral face-marks are narrower above, taken as a whole much like a hand with the index-finger pointing upwards, the upward prolongation being neither broadly truncate nor pointed. The tegulæ have a yellow spot. The label on the specimen declares it to be *modesta*, which I am sure it is not.

Mr. Dunning sends me four examples from N. J.; three of them, males, are genuine *ziziæ;* the fourth, a female, is rather larger, and has much coarser punctures on the thorax, wings clouded, except at base, and in other respects agrees with *confluens;* it has a yellow spot on the clypeus, not described by Smith in *confluens*. One of the *ziziæ* is from Ocean Grove, July 19th, 1893.

Thus we find in N. J. the three commonest Illinois species—*modesta*, *pygmæa*, and *ziziæ*, but, so far, none of the others. On the other hand, we have *confluens*, extending upwards along the Atlantic seaboard from Florida; for I feel reasonably sure that the male and female above described do really belong to that species.

NEW YORK.—Here we meet with the boreal *P. basalis*, Sm., a female, in Coll. Am. Ent. Soc., doubtless from the mountains.

Connecticut.—I have before me twenty-one specimens from this State, belonging to the following species:—

(1.) *P. ziziæ*, Rob. Three males in Coll. Am. Ent. Soc. Both sexes collected at Hartford by Mr. Dunning.

(2.) *P. pygmæa*, Cress. Hartford, May 27th, &c. Mr. Dunning.

(3.) *P. varifrons*, Cress. Hartford, July 30th, 1893. Mr. Dunning. Male.

(4.) *P. modesta*, Say. Two males in Coll. Am. Ent. Soc. A male, taken by Mr. Dunning at Hartford on July 30th, 1893, has the upward prolongations of the lateral face-marks rather after the manner of the New Jersey *confluens*, but the wings are not so dark, and the thorax not nearly so coarsely punctured.

(5). *P. verticalis*, Cress. One male in Coll. Am. Ent. Soc. Cresson gives this species as from Mass., Penn., Colo., but I suspect that his Colo. material belonged to *tridens* or *tridentula*.

Massachusetts.—There is a male *verticalis* in Coll. Am. Ent. Soc.; the antennæ are shorter than Cresson describes, but I have no doubt it is the same species. I have females of *modesta* from Mr. Baker and Mr. Dunning, the latter collected at Southampton, July 14th, 1894. One female has spots on tegulæ, and belongs perhaps to *ziziæ*.

New Hampshire.—There are several examples of *modesta* in Coll. Am. Ent. Soc., and one each of *ziziæ* and *basalis*. The Coll. Am. Ent. Soc. also contains several female examples of *varifrons*, one from the valleys of the White Mts.; these vary among themselves, some having, others being without, light marks on the hind border of prothorax. They differ from the Colorado form in lacking the spot on tegulæ, but this will scarcely indicate a distinct species. From *ziziæ* and *modesta*, female *varifrons* may be known by the narrower lateral face-marks, which are rather bow-shaped than triangular; from the Florida *schwarzii* it may be known at once by the much less infuscated wings, though it is in all respects very closely allied; from *elliptica* it is known by the absence of the transverse mark on clypeus,—it is probable that the specimens alluded to by Cresson as having this mark were really *elliptica*.

Canada.—I have seen the following:—

(1.) *P. basalis*, Sm. One female. English River, Quebec. Coll. Am. Ent. Soc.

(2.) *P. elliptica*, Kirby. One female. Coll. Am. Ent. Soc. Tegulæ wholly dark. Wings brownish-hyaline, not distinctly infuscated. Anterior margin of clypeus with a conspicuous transverse light band.

(3.) *P. varifrons*, Cress. Several females in U. S. N. M. One from Toronto, the others ex. coll. Coquillet. One marked as

P. affinis by Provancher. They have dark tegluæ as in the N. H. form.

(4.) *P. ziziæ*, Rob. One male. Toronto. U. S. N. M. Marked *modestus*.

(5.) *P. modesta*, Say. Two males. Col. Coquillett. U. S. N. M.

MICHIGAN.—Mr. Baker sent me a male *modesta* (determined by Fox as *affinis*) from Agricultural College, Mich.

MARYLAND.—In Coll. Am. Ent. Soc. is a male *antennata*, with face-markings white, tegulæ wholly dark. The type-locality of the species is New Jersey. It is very close to the male of *varifrons*, but there is less light colour on the scape, and the face-marks are not yellow. The face of *varifrons*, however, is sometimes very pale, so that I have thought it probable that the two names represented in reality but one species. If so, *antennata* will stand for all the eastern forms referred herein to it and *varifrons*, in which the tegulæ lack a light spot, and will constitute a geographical race. The type-locality of *varifrons* is Colorado. There is also in Coll. Am. Ent. Soc. a female of *varifrons* with dark tegulæ, or *antennata;* and a female of *modesta*.

DISTRICT OF COLUMBIA.—The U. S. N. M. contains a female *ziziæ* from the City of Washington, August 22nd, 1883, through C. V. Riley.

VIRGINIA.—The National Museum contains four examples from Virginia. Two, collected June 12th, 1881, are female *modesta;* one, dated June 25th, 1882, seems to be a *ziziæ*, but the head is missing; the fourth, dated June 27th, 1880, is a male *pennsylvanica*. The last species could be taken for *modesta*, did not one observe the strong punctuation of the first abdominal segment.

GEORGIA.—Here we meet with a series of species entirely different from those of the N. E. States. From males in Coll. Am. Ent. Soc. I have described three new species—*georgica*, *triangularis*, and *labiatifrons*. The same collection also contains two males of *P. divergens*, which was described from an altitude of 7000 feet in Colorado! By the face-marks this is much like *georgica*, but the first abdominal segment is strongly punctured, in the manner characteristic of western species, whereas in *georgica* it is minutely tessellate and practically impunctate. I cannot help suspecting that the locality-label on these two *divergens* is erroneous, though it is by no means impossible that it may be correct.

A number of female *Prosapis* from Georgia, in Coll. Am. Ent. Soc., have given me some trouble. Three I referred to *floridana*, Rob.; but a renewed examination, and comparison with one of the types of *floridana*, kindly lent by Mr. Robertson, indicate that this is probably an error. One of the three is distinct from the other two by its broad face, shorter lateral face-marks, and more dusky wings. The two others are very near to *floridana* indeed, especially in the form of the face-marks, but that has a perceptibly narrower face, and seems to be different. It may be that they represent the female of *georgica.* The lateral face-marks in these forms are very elongated triangles, more or less truncate at the upper end; thus they are longer and not so broad as in *ziziæ* and *modesta* females, but at the same time they are more distinctly triangular than is usual in *varifrons.* Another Georgia female, which I had put aside as distinct, seems to be really *floridana.*

Another series of Georgia females represents a larger species, with perceptibly darkened wings, and chrome-yellow face-marks shaped as in *modesta.* This, I take it, is the female of *triangularis.* It will not be confounded with *schwarzii,* as that has the lateral face-marks so much narrower and paler, and the wings still darker. It might more easily be taken for *confluens,* but the punctuation of the mesothorax is by no means so coarse, nor confluent, and the sculpturing of the front is very much finer, not running into grooves as in *confluens.*

It is pertinent to remark, that the male *triangularis* is very much like the N. J. male supposed to be *confluens,* but the supra-clypeal mark is longer, and its lower margin is almost straight, whereas in the N. J. insect it is noticeably curved. The ocelli are smaller and somewhat closer together in the N. J. insect. The N. J. male is not like the female *confluens* in the sculpturing of the front.

The student will, I am afraid, feel much dissatisfied with the uncertainty of the conclusions reached above; but he is reminded that the study of miscellaneous specimens without any biological data can never lead to the best results; and it is the writer's purpose rather to insist upon the need for further investigation, than to suggest that the present results are in any sense final.

(To be continued.)

A NEW SPECIES OF *CHARAXES* FROM SIAM.

By Percy I. Lathy.

Charaxes nigrobasalis, sp. nov.

♂. Fore wings similar to *C. rothschildi,* Leech, but paler. The basal black does not extend so far along inner margin as in that species, and the black marginal border is much narrower at the anal angle. Hind wings as in *C. eudamippus,* Doubld., but row of light marginal spots paler. Thorax blackish, abdomen pale yellow. Under side as in *C. eudamippus,* Doubld., but with submarginal orange markings and orange spot at anal angle much more dull and indistinct.

Hab. Pak-a-jong, Siam. In coll. H. J. Adams.

Two males of this interesting species have just been received by Mr. Adams from Mr. W. Watkins, of Eastbourne.

It may easily be distinguished from *C. rothschildi*, Leech, by the narrow band of the hind wings, and pale yellow abdomen; and from *C. eudamippus*, Doubld., by the black base of the fore wings, and by the whole of the discoidal cell being filled in with black.

Lynton Villa, Sydney Road, Enfield.

AMONG THE BUTTERFLIES AND FLOWERS OF NORWAY.

By R. S. Standen, F.L.S., F.E.S.

There is a charm attaching to Entomology which few other sciences possess; it impels its votaries to foreign climes. Bates's "half-starved fragment" is no longer the fetich of a crowd, but is recognized for the tail-end only of a vast geological area that it really is. The glittering halos of the British-caught Antiopas and Lathonias of our youth have a sadly tarnished lustre now, and, when we meet these lovely creatures in their hosts on the Continent we sigh for the pleasing illusions of the past, but rejoice in our emancipation. And so, after having explored at different periods most of the central and southern countries of Europe, a friend and I found ourselves, on the last Sunday in June, in the bright little capital of Norway.

We were both of us more or less familiar with the phenomena of the midnight sun, but it was something of a surprise to find that, as far south as Christiania, it was still possible at 12 p.m. to read a book at the open window without artificial light. It was still more strange perhaps to see people promenading the streets and public gardens, and sitting about on benches, long after midnight, in costumes of the most light and airy description. It is difficult to realize that we are in the 60th degree of North latitude, with a sky as pure and an atmosphere as dry and warm as that of Florence.

Such an introduction to the northern capital augured well for our brief visit to the country, and with few exceptions the promise of fine weather was well maintained.

We proposed to make careful notes of all the Lepidoptera—more especially Rhopalocera—that came under our observation; also of all the Phanerogamia, and, in my friend's case, of mosses, of which he collected, as it seemed to me, about half a cart-load, and will doubtless give a good account of them elsewhere. But in our secret hearts we pined after *Argynnis freija*, *Erebia embla*, and *Œneis jutta*—quite satisfied of course to have a good look at them and establish their identity; but, as my companion archly observed, when taxed with the discrepancy between his principles and his active conduct with the net, there was no harm in securing a few for the benefit of one's friends! And certainly, taking the amount of downright hard labour into account, the doctrine of altruism was never better illustrated.

The locality indicated to us by "Statsentomolog" Schöyen was Disenaaen on the Kongsvinger line of rail, about forty miles N.E. by E. of Christiania, and we were fortunate in meeting with most excellent accommodation at Saeterstöen, three miles away, but in the neighbourhood of which also both *embla* and *jutta* were fairly abundant.

For *freija* we were unhappily too late, although a friend who preceded us by a week obtained, I believe, the one specimen necessary to establish its existence. Although *embla* and *jutta* were considerably to the fore, both here and at Disenaaen, perfect examples were in the proportion of one to three at the outside. Both of them—more especially *jutta*—have a habit of sitting sideways, with closed wings, on the trunks of small firs, with the ragged bits of whose bark they are easily confounded. I must confess I took full advantage of this peculiarity, to the great saving of both wind and legs.

They have an exasperating zigzag method of flight, and after you have pursued one some way he will often suddenly disappear in mid air as if by magic; then you know what has happened, and by a cautious stalk from behind you may generally sweep him off the tree on which he has settled.

A. aphirape was also common enough locally, but, until we got accustomed to its hesitating mode and slightly duskier appearance, it was easy to mistake it for *A. euphrosyne*.

In selecting a habitat for these three creatures it is certain that the Creator took no account of the requirements of their puny captor, man. It may be worse in the tropics—it no doubt *is*—but, for Europe, of all the damp, treacherous, unpleasant soils the entomologist has to negotiate this would be hard to beat. A bog of yielding mosses and juicy peat, in which you flounder a foot deep at every step, and are lucky when the water does not come above the ankle—felled pine trunks and jagged branches lying prostrate in every direction, and tripping you up in the chase more frequently than you care to be reminded of—lovely grey patches of reindeer-moss, looking, at a little distance, beneath the flickering shade of scraggy firs, for all the world like a cool grey rock inviting a rest, and which if, in an unwary and exhausted moment you yield to the temptation, only lands the nether portion of your person in a bath of slush. Added to this, the thin stems of the ubiquitous fir and birch seem expressly invented to baffle the netsman and help the wary prey. So the task of collecting for friends is not all "cakes and ale."

But, *en revanche*, in cloudy intervals—not always the worst for these species by the way—or when exhausted nature clamours for repose, what gems of plant-life greet the eye! *Linnæa borealis*, with its delicate little nodding white bell lined with rose-pink, two on each slender peduncle, is everywhere present, tenderly reminiscent of the great Swede whose favourite it was. The white star of *Trientalis europæa* rises modestly from the bed of *Sphagnum* that holds its tender rootlets in loving embrace; and the three *Vacciniums—occycoccus, Vitis idæa* and *uliginosum*—are almost universally abundant; as is also, in the more open parts of the bog, *Rubus chamæmorus*, the cloudberry.

Our road to the Disenaaen bog lay along the railway—three miles of it—and a fine of two *krone* for trespass; but the officials were most polite, and the rule appeared to be relaxed in our favour. On each side of the single line of rails were broad, sloping banks, densely diapered with many kinds of greenery. Here were *Equisetum sylvaticum*, and two others, in great abundance—the smallest of them looking, at a little distance, like a long-piled carpet on the uppermost edge of the bank, and creeping even under the rails and in between the sleepers. Here also were *Pyrola media, minor* and *uniflora—Moneses grandiflora* of the 'London Catalogue.' When now, for the first time, I saw this lovely thing alive the barren poverty of my "Hortus Siccus" struck home to me like a blight. "Good-bye to the Herbarium!" I said; but things look different when you get home, and that long row of portfolios so neatly labelled is still unburnt. Another delicate little plant, *Smilacina bifolia* (*Maianthemum convallaria*), the May lily, found only in one spot near Scarborough with us, was common enough in places, and quite abundant on the roadsides near Christiania. Large white patches of *Galium boreale* occurred here and there, and the beautiful white arum-like heads of *Calla palustris* lit up the dark quagmires of the bog that skirted the rail with an almost uncanny lustre. But dazzling beyond everything else were broad clusters of the rich crimson-purple *Lychnis viscaria*. They were our landmarks along the line. At this one you entered the bog for *E. embla*, just beyond that one was a spring of the purest and coldest water, and when the eye once rested upon one of these patches all else was merged in grey. A dangerous competitor would be *Epilobium angustifolium*, if they were both out together—not so aggressive to the eye, but more graceful, and more tender in its rose-bay tints, and it made a broad fringe all along the line.

The butterflies that occurred most commonly on these banks were *P. machaon, A. cratægi, P. brassicæ, E. cardamines, L. sinapis, C. palæno, T. rubi, P. hypothoë, L. ægon, semiargus* and *cyllarus*, an occasional battered *V. antiopa, M. athalia, A. selene* and *euphrosyne* (both extremely common), *P. hiera, C. pamphilus* and *typhon*, *S. malvæ*, *N. tages*, *H. sylvanus*. Wild strawberries were in countless thousands, and delightfully cool and refreshing in the hot sun, whilst a long range of blue hills along the horizon was equally so to the eye.

Before taking leave of this first portion of our trip, I feel that, for the sake of any who may be disposed to follow in our steps, I cannot do less than highly commend the house of our cultivated hosts, Herr. and Fru Wattne, of Maarud, Saeterstöen, per Christiania. He has a large farm, and the comfort and attention we experienced at their hands were beyond anything I can recall on similar occasions elsewhere.

(To be continued.)

NOTES AND OBSERVATIONS.

Larvæ of Pygæra (Clostera) reclusa Eating Larvæ of Dicranura vinula.—I have been rearing a brood of some thirty-five larvæ of *C. reclusa*, and when they were about half grown I put in with them fourteen larvæ of *D. vinula* freshly emerged from the ova. However, after a day or two, observing that the numbers of the latter grew "small by degrees and beautifully less," I kept them under close supervision, with the result that I caught a fine *reclusa* "red-handed," and thus accounted for the mysterious disappearance of the young *vinula!* Is it not rather unusual for this species to display such voracity? I can assign no reason whatever for their conduct, as they were abundantly supplied with young poplar leaves kept always fresh by having the stalks in water, and it therefore cannot have been for want of food. I reared a large number of *C. curtula* last season; and, although they were kept together with some young *vinula*, they showed no such cannibalistic propensities.—H. W. Shepheard-Walwyn; West Downs, Winchester.

Butalis cicadella, Z., *not* in Lancashire.—In the 'Entomologist,' xxvii. 246 (1894), the late Mr. J. B. Hodgkinson records the occurrence of *Butalis cicadella* in Lancashire, stating that he took a very fine example of it near Fleetwood on June 15th, 1894, and was able to identify it by comparison with a specimen in his cabinet, which had been captured at Southend by Mr. S. Stevens about forty years before. When Mr. Hodgkinson's collection was on view at Stevens's rooms in December last, I examined the series of *B. cicadella*, left exactly as he had arranged it, and found that it consisted of three specimens. The first, beneath which was Hodgkinson's MS. label—"Lane near Wyre, June 15th, 1894"—was obviously the moth referred to in his published note (*loc. cit.*), "Fleetwood" and "Wyre" being used synonymously; but instead of being *B. cicadella* it was in reality a dark unicolorous example of *Bucculatrix maritima*, Stn., bearing not the faintest resemblance to any *Butalis!* The second was a *Butalis* so hopelessly rubbed and discoloured that certain recognition was impossible, though it clearly never was *cicadella;* while the third was the example of the true *B. cicadella*, Z., that had been received from Mr. S. Stevens. The lot containing them fell to me, so I have been able to examine them again at leisure. In his note (*loc. cit.*) Hodgkinson says that *B. cicadella* had previously only been taken by Messrs. Dunning and S. Stevens; but as a matter of fact it had also been captured by Messrs. R. McLachlan (E. M. M. viii. 92) and W. Farren (Entom. xxi. 62). I have used the name *Butalis* above because Hodgkinson did so in his note; but the genus should be known as *Galanthia*, Hb.—Eustace R. Bankes; The Rectory, Corfe Castle, June 24th, 1898.

Localities for Dragonflies wanted.—Mr. Lucas, of 278, King's Road, Kingston-on-Thames, would be glad to receive well-authenticated localities of the British dragonflies, for work on the group that he is preparing.

CAPTURES AND FIELD REPORTS.

Argynnis latona in Somersetshire. — On July 20th I captured a nice specimen of *Argynnis latona* near a clover field at a place about four miles from Clifton. It measures 4·5 centimetres across the wings. The Rev. Joseph Greene has seen the insect, and says that it is undoubtedly *A. latona.* — Ralph Rylands; School House, Clifton College, Clifton, Bristol.

Plusia moneta in Kent. — It may be interesting to record that a working man has found in his garden, situated in the heart of the east end of this town, ten cocoons of *Plusia moneta*, from four of which imagines have emerged. They were found on the under side of the leaves of monkshood. Evidently this beautiful moth has come to stay, as I have taken eight at light during the last few years. — R. A. Dallas Beeching; 24, St. James Road, Tunbridge Wells.

Plusia moneta in Surrey. — I understand that a cocoon of this species has been found at Surbiton just recently.—R. South; July 23rd.

Agrotis ashworthii in North Wales.—I have just bred a lovely series of *Agrotis ashworthii* from larvæ taken at Penmænmaur the last week in April. The form is distinctly darker than the Llangollen form of the species, and the markings scarcely so clearly defined. The rock cistus does not grow at Penmænmaur, and I found my larvæ mostly on sheep's sorrel (*Rumex acetosella*), growing on the barest parts of the mountain.—Geo. T. Porritt; Crosland Hall, Huddersfield, July 4th, 1898.

Eupithecia venosata at Balham. — On July 2nd last I saw a nice fresh specimen of this species at rest on a fence near the station. The food-plant (*Silene inflata*) occurs sparingly on the side of the railway just opposite the spot where the insect was noticed.—Richard South; 100, Ritherdon Road, Upper Tooting, S.W.

Dicranura vinula at Chester and Riga.—This moth was unusually common at Chester in the first week of June. It appears to have been equally observed at Riga (Russia), and at the same time. A fine male taken at the last-mentioned locality, which I have just set, is smaller, paler, and much less marked than our English specimens.—J. Arkle; Chester.

LITHOSIA MESOMELLA IN DELAMERE FOREST.—During an afternoon ramble in Delamere Forest (June 29th) by members of the Chester Natural Science Society, three specimens of *L. mesomella* were taken at rest. As far as I know, the earliest record of the insect for the district is one of my own (see Entom. xxvii. 247). We found other good moths fairly common during the ramble, such as *Eucosmia undulata*, *Macaria liturata*, and *Drepana falcataria* (*falcula*).—J. ARKLE; Chester.

LAMPYRIS NOCTILUCA NEAR CHESTER. — Whilst sugaring at Sealand, with the Messrs. Thompson, of Chester, on the night of June 24th, we came across two of these beetles—the well-known "glowworms." The species has been taken previously, but rarely, I believe, near Chester; at any rate, this is the first occasion I have met with it in the district. The Messrs. Thompson tell me they have come upon as many as five in an evening in the Sealand neighbourhood. I well remember the wonder and admiration I felt upon seeing "glowworms" for the first time, some years ago, in the Tan-y-Bwlch valley, North Wales (Entom. xxvi. 289). — J. ARKLE; Chester.

NEW FOREST, 1898.—Nine days' collecting at Lyndhurst with Mr. A. G. Saunders, from June 3rd to June 12th, produced very favourable results, considering the lateness of the season. The weather turned out very fine, but it was very cold at night. At Stubby Copse *Nemeobius lucina* was very abundant, but rather worn; *Argynnis selene* and *A. euphrosyne* were, however, in splendid condition. *Syrichthus alveolus* was abundant, and I managed to get two nice varieties. On June 5th we visited the Rhinefields, and found the rhododendrons very backward; but the azaleas were in full bloom, and we took seven *Macroglossa fuciformis;* on June 11th I again went there, and took fifteen *fuciformis* in very fine condition, but no *M. bombyliformis*, although the latter were common on the railway bank near Brockenhurst. During the day we took *Boarmia consortaria*, *Ephyra omicronaria*, *Venilia maculata*, *Lithosia aureola*, *Moma orion* (one at rest on a beech trunk), *Phytometra ænea*, *Coremia propugnata*, *Euchelia jacobææ*, *Euclidia mi*, *E. glyphica*, *Panagra petraria*, *Ligdia adustata*, *Corycia taminata*, *Melanthia ocellata*, *Bombyx rubi* (including three females), *Scodiona belgiaria* (abundant), *Fidonia atomaria*, *Aspilates strigillaria*, *Nemoria viridata* (common), and *Spilosoma mendica*. Sugaring proved very unsuccessful; only nine *Thyatira batis*, three *Miana strigilis*, three *Grammesia trilinea*, one *Acronycta psi*, one *Noctua plecta*, and one *Aplecta herbida* came to the bait. Beating for larvæ was very unproductive, except for a small larva of *Apatura iris*, which fell from a sallow into the beating-tray; while the oaks at Hurst Hill only resulted in one very small larva of *Catocala sponsa*, and not a single *C. promissa*. On the heath there were plenty of larvæ of *Bombyx trifolii*, *Agrotis agathina*, *Noctua neglecta*, and *Selidosema plumaria;* and by searching the honeysuckle we only obtained two full-grown larvæ of *Limenitis sibylla*, while from lichens a few larvæ of *Cleora glabraria* and *C. lichenaria* were collected. The other larvæ were *Tephrosia biundularia*, *Bombyx neustria*, *Argynnis paphia*, *Tæniocampa munda*, and *Amphipyra pyramidea*. — H. O. WELLS; Hurstfield, The Avenue, Gipsy Hill, London, S.E., July 5th, 1898.

SOCIETIES.

South London Entomological and Natural History Society.—*June* 23*rd*, 1898.—Mr. J. W. Tutt, F.E.S., President, in the chair. Mr. Broome, Christchurch, Oxford, was elected a member. Mr. Filer exhibited living larvæ of *Thecla rubi* feeding on rock-rose (*Cistus*), and called attention to their remarkable protective coloration. Mr. Adkin, larvæ of *Acidalia marginipunctata* (*promutata*), and read notes on their habits. Some were nearly full-fed, while others were small. The ova had hatched in the early autumn. Mr. Moore, two fine varieties of *Arctia caia* bred from ova by Mr. Cooke: 1, fore wings uniformly dark chocolate without the usual cream markings; 2, fore wings with a very considerable decrease in the area covered by the dark markings. The larvæ, some sixty in number, fed all the winter on cabbage. Mr. West, the Coleoptera he had taken at the Reigate field-meeting. Mr. Barnett, a specimen of *Venilia maculata* having the dark blotches irregularly joined and blurred on one side only.

July 14*th*.—Mr. R. Adkin, F.E.S., Vice-President, in the chair. Mr. H. Shortridge Clarke, F.E.S., Sulby Vicarage, Isle of Man, was elected a member. Mr. South exhibited a series of *Lycæna corydon*, to illustrate the variation in the number and arrangement of the spots on the under surface; also a series of forty-two *Spilosoma lubricipeda*, comprising thirty-five var. *zatima* = *radiata* in both sexes, and seven typical males, all reared from ova laid by a dark female *zatima*. Mr. Moore, a dwarf specimen of *Polyommatus icarus* from Folkestone. Mr. Lucas, specimens of *Libellula quadrimaculata* showing considerable variation in the size of the dark spot, and also in the amount of the saffron coloration. Mr. West (Greenwich), a short series of the local hemipteron, *Lopus flavomarginatus*, from Abbey Wood. Mr. Dennis, the egg of *Polymmatus icarus* under the microscope. It was comparable to a beautiful white double dahlia. Mr. Adkin read a report of the field-meeting held at Reigate on June 11th.—Hy. J. Turner, *Hon. Rep. Sec.*

Birmingham Entomological Society.—*June* 20*th*, 1898.—Mr. R. C. Bradley in the chair. Mr. H. Willoughby Ellis, Park Grove, Solihull, was elected a member. Mr. C. J. Wainwright showed a short series of *Orthoneura elegans* (four males, four females) and *O. brevicornis* (nine males) from Sutton, taken on May 15th and 22nd this year, and said that both species were exceedingly rare, and that they had previously been known as British only from a few odd specimens. Mr. Bradley showed *Anthophora pilipes* and *Andrena gwynana*, both of which species had been very common at Droitwich in the first week of April this year. Mr. Martineau said that *A. pilipes* occurred at Solihull, and was doing much damage to the church wall by burrowing in the red sandstone of which it consists. Mr. Fountain showed a collection of insects made in Herefordshire on Whit Monday, including *Epione advenaria*, *Ligdia adustata*, *Minoa euphorbiata*, *Ephyra omicronaria*, *Hadena genistæ*, *Cucullia verbasci*, &c. Mr. Martineau showed *Andrena cingulata*, male and female, from Bewdley, where they were taken on May 9th; he said they were the first local specimens he had heard of. —Colbran J. Wainwright, *Hon. Sec.*

Kendal Entomological Society.—On July 11th the second meeting of this Society was held in the Blue Coat School, and was very well attended, twenty-five members being present. Three new members were elected. Dr. Parker laid before the Society his scheme whereby the Entomological Society, while retaining its independence, should be recognized by the Town Council as one branch of a larger body in the shape of a Natural History Society generally. He further stated that the Town Council had handed over a room in Abbot Hall for the exclusive use of the Natural History Society, and that the Education Committee were generously prepared to provide funds for its maintenance, such as lighting, heating, cleaning, and any necessary printing, &c. He believed also that they would provide a cabinet in which a model collection of the lepidopterous fauna of the district might be made. Mr. Moss, in reply, thanked Dr. Parker for his suggestions, and for the trouble he had taken on behalf of the Society, and suggested that they should accept the offer, thus made, with gratitude. He stated that by so doing the Society could lose nothing, but would probably gain considerably by being recognized by the town, by having efficient headquarters, and by associating with other branches of natural science. Practically the only change would be that the Society would hold its meetings in Abbot Hall instead of in the Blue Coat School. The motion was put to the meeting and unanimously accepted. The Rev. A. M. Moss then gave an elementary lecture on the forming of a collection of Macro-Lepidoptera, urging the members to have some definite end and aim in collecting, and not to collect merely for the sake of amassing numbers of specimens, or for any low and unsportsmanlike motive, which was contrary to the true spirit of an entomologist. He emphasized the value of thoroughness in every department of the work, if success was to be attained. Mr. Holmes exhibited a case of Lepidoptera captured since the previous meeting, embracing amongst other good forms a fine variety of *Abraxas grossulariata*, in which the costa and outer margin of the fore wings were almost entirely black. He also exhibited a nice series of newly-captured and unset *Erebia epiphron*, from Red Skrees. Mr. Inder, two bred specimens of *Acronycta menyanthidis*, and some others. Mr. Littlewood, a case of nicely-set insects, some recently caught, some of previous year, and showing pupæ-cases in several instances, a point which it was hoped would be more universally adopted. Mr. Moss, a drawer of hawk-moths and clear-wings, and a box of recent captures and bred specimens, including a series of *Nemeobius lucina*, *Procris statices*, *P. geryon*, and *Zygæna filipendulæ*, caught on a railway bank, one with with only five spots, and two others with the middle pair of spots much reduced in size; also a specimen of *Macroglossa bombyliformis*, from the same place. Mr. Smith reported having just taken var. *hospita* of *Chelonia plantaginis* on Red Skrees. Mr. Whitehead exhibited two *E. epiphron*, *C. plantaginis*, *Scodiona belgiaria*, and others, taken in the Langdale district. Mr. Wright exhibited a specimen of *Bombyx rubi*, *Acronycta rumicis*, and a specimen of *Plusia interrogationis*, bred from a pupa found spun up on heather near Staveley.

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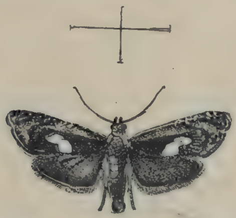
DICHRORAMPHA FLAVIDORSANA, Knaggs.

By H. Guard Knaggs, M.D., F.L.S., &c.



D. flavidorsana, reproduced from Robinson's figure (*E. A. for* 1867).

Some time ago my attention was drawn by Mr. South to an article in the 'Annals of the Entomological Society of Belgium' (February, 1898, pp. 34–38), by Baron de Crombrugghe de Picquendaele, on certain Lepidoptera new to the Belgian fauna, wherein was a note referring to the distinctness of the above insect from *D. petiverella*, the difference of its habits from that species, and its attachment to its food—the tansy.

After reading this I took the liberty of writing to the Baron, who most obligingly supplied me with half a dozen specimens of the insect in question, and informed me that they had been named "*D. flavidorsana*, Knaggs," by Drs. Staudinger and Bang-Haas; but that Lord Walsingham had subsequently pointed out to him that they were *quæstionana*, Zeller = *alpinana* of Stainton's 'Manual.'

From my recollection of the original specimen, from which my description (E. M. M. iii. pp. 176–7) and Robinson's figure (Ent. Annual for 1867, plate, fig. No. 5) were taken, I felt satisfied that *flavidorsana* could not be *petiverella*, and therefore referred to my above-mentioned description, where I found:—

1st. That Mr. Doubleday (in 1864 or 1865) was "confident that it was merely a variety of *alpinana*."*

2nd. That about that time (1864–5) I returned the insect to Mr. Barrett as "*alpinana?*"*

3rd. That in describing the original male (in 1867) I stated that it partook of the characters of *alpinana*,* excepting that the ground colour was darker, the bright tawny markings at the apex and hind margin were more evident, and the yellow lunule was more conspicuous and more vivid. I note, too, that it was on these very characters that Prof. Zeller, in his "Albula Fauna" (Stettin. Ent. Zeitung, 1878), laid stress in differentiating his *quæstionana* from the ordinary *alpinana** of the period.

Under these circumstances I sought the assistance of my good friend Mr. C. G. Barrett, asking if he could let me have a sight of the original specimen if still in existence, a request with which he not only most kindly complied, but went to the further trouble of procuring for me, from Dr. Mason, the loan of Mr. Meek's North Devonshire insect, which was considered by Mr. Doubleday and myself, in 1867, to be a variety of *flavidorsana*, notwithstanding that it differed from the latter, inasmuch as the dorsal blotch bore a resemblance to that of *petiverella*, as stated at the time (E. M. M. iii. p. 177).

I am now, on re-examination of these specimens, compelled to modify the views I held in 1867, and in doing so shall confine my remarks to the males; the specimens sent to me as the females, which I simply described as "excessively like *petiverella*," certainly belonging to that species; and indeed my friend Mr. Barrett, in answer to a query of mine, says that he had *no proof at all* that they were the females of *flavidorsana*.

As for the males—which I think I have never, till now, seen side by side—Mr. Meek's specimen appears to be *petiverella*, with a curiously-formed dorsal blotch, looking as if two twin blotches had become united into one, with a small dark spot at the broadened base close to the dorsal margin. Mr. Barrett's original type, on the other hand, seems to me to be identical with *quæstionana*, Z., = *alpinana* of the 'Manual,' the difference in character of its darker ground colour, the brighter tawny markings at apex and hind margin, and the conspicuous bright yellow dorsal patch being insufficient to separate it as a distinct species; for I find that, the insect, from these parts at any rate, is more variable in these respects than I had formerly imagined it to be.

However, with Mr. Barrett's and Dr. Mason's permission, I purpose exhibiting these interesting specimens, together with examples of Folkestone *flavidorsana* (kindly lent by my friend Mr. Purdey), at an early meeting of the London Entomological

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* The *alpinana* here referred to means the *alpinana* of Stainton's 'Manual.'

Society, in order that the Fellows may have an opportunity of judging whether *flavidorsana* is really *petiverella* or *quæstionana*.

Folkestone: August, 1898.

A GUIDE TO THE STUDY OF BRITISH WATERBUGS (AQUATIC RHYNCHOTA).

By G. W. Kirkaldy.

(Continued from p. 180.)

Mounting.

Until a few years ago the almost universal method of mounting bugs and beetles consisted in gumming or glueing the ventral surface of the insect on to a square or oblong piece of card, sometimes with the legs carefully extended, but more often cramped together under the body. Now, considering that very important specific characters are furnished by the legs and ventral surface of waterbugs, this method is evidently inconvenient, and I am of the opinion that it is best to *pin* whenever possible.

Notonecta, *Nepidæ*, *Naucoridæ*, and the three larger species of *Gerris*, should be transfixed through the scutellum by a fairly stout "entomological" pin, about 35 millimeters (*i.e.* one inch and three-eighths) long; for example, D. F. Tayler & Co.'s No. 16.

The specimens should be transfixed up to within about half an inch from the head of the pin, and I think that a strong pin is a great advantage, on account of retaining its position firmly and steadily in the cork, and not suddenly bending at various points, as is the custom of the very fine pins used by many continental rhynchotists. After the lapse of years the general condition of the insects mounted in the former manner will be found to be much better than those mounted in the latter way.

British collectors have long been notorious on account of their predilection for short pins; the advantages, on the other hand, in favour of those I have previously mentioned are very great; for instance, the danger of attack from *Anthrenus*, *Atropos*, &c., is minimised almost to the vanishing point (although of course the usual precautions must be adopted), and the space for necessary labels is much increased.

I cannot recommend black pins,—they are too soft and pliant. Headless pins have often been advocated, but I think that a small head is a great improvement.

For *Velia*, *Aëpophilus*, *Acanthia*, and the smaller species of *Gerris*, the smallest and finest pin obtainable (about 14 millimeters, say half an inch long) should be employed. This is thrust through the scutellum, as in the larger species, and then through a small piece of pith.* Through the other end of the pith is stuck a No. 16 pin. The labels will, of course, be affixed to the larger pin. The male and female (especially when caught *in cop.*) can be pinned on the same piece of pith.

It is not advisable to pin *Corixæ* at all, as there is no visible scutellum, and as a very valuable specific character, the *strigil*, occurs on the dorsal surface of the sixth abdominal segment of the male, the ornamental sex cannot be pinned through the elytra. These insects should, therefore, be affixed with gum or glue to the apex of a small isosceles triangle of cardboard of medium thickness, through the base of which is run a No. 16 pin. If possible, the tip of the card should cover only the metasternum or first abdominal segment on one side; by this method practically the whole insect is available for examination, and, if preferred, it may be adopted in the case of those specimens for which I have advocated the pith staging. *Plea*, *Micronecta*, and the smaller *Gerridæ* may be mounted on small oblongs of card, affixed by the ventral surface. Before mounting, the legs (and, in the *Gerridæ*, the antennæ) should be thoroughly cleaned and carefully spread out; one or two examples of each species should be mounted venter upwards, and one or two on their sides. I must admit that I have not yet found a really convenient fixative; a good liquid glue is perhaps the best,—the formerly much advocated gum tragacanth is an abomination, and should not be used under any circumstances.

Specimens should be mounted as soon as possible after capture.

Of course these methods take a much longer time than the older methods of glueing everything down on to card, but the first consideration should be, "What is the *best* and most *convenient* mode of preparation to facilitate future study?" Moreover, the heterogeneous appearance occasioned by the different ways of setting, some on single pins, others staged, others on triangular cards, and yet others on oblong cards, will undoubtedly be displeasing to those gentlemen to whom it is of prime importance that every specimen should be at precisely the same distance from the point of the pin, and that the legs in every specimen should be extended at precisely the same angle; but I hope that any of my readers who may be induced to take up the collection of British Aquatic Rhynchota will do so with the ulterior motive of *study*.

A few examples of each species should be preserved in alcohol or formalin, both imagines and "preparatory" stages. The latter will be discussed separately later.

There should be attached to every specimen at least two labels, one with the locality, the other with the name of the insect; and when specimens have been received from correspondents, it is well to add a third bearing the name of the sender. In my own collection, when I have been able to examine the original type specimen of any species, and to compare with it my own or other examples, I add a fourth label, "Compared with the Type in . . . . . colln. by G. W. Kirkaldy." This is more useful perhaps in rare and little known exotic species.

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* Messrs. Watkins & Doncaster sell "Polyporus" pith for this purpose.

Note-books are necessary for the registration of species, both those obtained from other workers and those collected by oneself, with notes on habits, locality, &c.

It will not be necessary to speak here of cabinets, store-boxes, mite and mould preventives, as the treatment in this case will not differ materially from that adopted for other insects.

In concluding the hints on "*Mounting*," I would reiterate "use long pins," "mount as soon as possible after capture," and "label fully."

One word as to measuring. It is the almost universal practice among entomologists to employ the metrical system, and it will be well for young collectors to familiarize themselves with it.

LITERATURE.

The following are a few of the books and papers that should prove useful to the British collector:—

1. Saunders—'Hemiptera-Heteroptera of the British Isles.' (Reeves, 1892. 14s.). In this indispensable work, analytical tables and short descriptions are given of all the species known up to 1892. As the author does not adopt the almost universally accepted "law of priority" in nomenclature, a short list of necessary alterations will be given subsequently.

2. Douglas and Scott — 'British Hemiptera-Heteroptera' (Ray Society, 1865. Obtainable from secondhand booksellers for about 18s.). This work is out of date; and, moreover, possesses the disadvantage of being unprovided with analytical tables; nevertheless, it is well worthy, from the excellence of the illustrations, of being added to the student's shelves.

3. Dufour—'Recherches anatomiques . . . sur les Hemiptères' (Mém. Savants Etrang. à l'Acad. Sci. iv. pp. 129–462; 1833. Obtainable from secondhand booksellers for about 16s.). These researches deal with the anatomy and biology of a number of species occurring in the British Isles.

4. Miall—'Natural History of Aquatic Insects.' (Macmillan, 1895. 6s.) Sixteen pages deal with waterbugs.

The student will also, after mastering these works, find it well to become acquainted with the papers dealing with the waterbugs of the various European countries by Fieber, Stål, J. Sahlberg, Puton, Horváth, &c.

5. Riley—"Directions for Collecting and Preserving Insects" ('Bulletin of the United States National Museum,' No. 39, Part F, 1892). This profusely illustrated work of nearly one hundred and fifty pages can be obtained on application to the Secretary of the Smithsonian Institute, Washington, D.C. I believe that applications from *bona fide* workers are not refused.

6. A label list, based on Mr. Saunders's work, is obtainable from Mr. T. M. McGregor, of Perth.

(To be continued.)

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 107.)

PYRALIDES.

Aglossa pinguinalis, *L.*—Universally distributed.

[Pyralis glaucinalis, *L.* — Recorded by Sinclair from "Wicklow," on what authority I know not. No specimen in his collection. I think it as well to await a better authenticated capture.]

Pyralis farinalis, *L.*—Common.

Scoparia ambigualis, *Tr.*—Widely distributed. Powerscourt, Co. Wicklow, common (*B.*); Belfast (*W*); Armagh (*J.*); Monaghan and Tyrone; Farnham, Cavan; Donegal; Markree Castle, Sligo; Clonbrock, Co. Galway; Crookhaven, Glengarriff, and Killarney, Co. Kerry; Dromoland Castle, Co. Clare, &c.

Scoparia cembræ, *Haw.*—Howth (*B.*), Co. Dublin; Magilligan, Co. Derry; Valentines Glen, Belfast (*W.*).

Scoparia dubitalis, *Hb.*—Not rare. Killarney, abundant; Killynon, Co. Westmeath; Howth; and near Belfast (*W.*).

Scoparia murana, *Curt.*—"Belfast, Mr. Hogan" (*B.*).

Scoparia lineola, *Curt.*—"Galway, August" (*B.*); Howth (*Shield*), and Skerries, Co. Dublin; Magilligan, Co. Derry (*Curzon*).

Scoparia mercurella, *L.*—Pretty common.

Scoparia cratægella, *Hb.*—Howth; Dromana and Cappagh, Co. Waterford; Ardtully near Kenmare, Co. Kerry; Clonbrock, Co. Galway.

Scoparia resinea, *Haw.*—Powerscourt, Co. Wicklow (*B.*); Loo Bridge, near Kenmare, Co. Kerry.

Scoparia truncicolella, *Sta.*—Sneem, Ardtully near Kenmare, and Killarney, Co. Kerry; Dromana, Co. Waterford; Favour Royal, Co. Tyrone; Armagh (*J.*).

SCOPARIA ANGUSTEA, *St.*—"Dublin, Howth, August and September; and in May and June hybernated specimens" (*B.*); Armagh (*J.*).

SCOPARIA ATOMALIS, *Dbl.*—Howth; Markree Castle, Sligo.

SCOPARIA PALLIDA, *St.*—Howth (*B. and G. V. H.*); Drumreaske, Co. Monaghan; Armagh (*J.*); Belfast, abundant (*W.*); Ballincar, Co. Donegal (*R.*); Dunmore, Co. Waterford.

NOMOPHILA NOCTUELLA, *Schiff.*—Widely distributed, and very abundant where it occurs. Kingstown, and Howth (*G. V. H.*), Co. Dublin; Glendalough, Connemara; Enniscoe, Co. Mayo; Cappagh, Co. Waterford; and Minehead are some of the places where I have seen it extremely numerous.

PYRAUSTA PURPURALIS, *L.*—Common and widely spread.

PYRAUSTA OSTRINALIS, *Hb.*—Common and widely spread.

RHODARIA SANGUINALIS, *L.*—Locally abundant in the Co. Galway, namely, Ardrahan, Kilcornan, and Merlin Park; Dromoland Castle, Co. Clare; and probably also elsewhere on the similar limestone pastures of "the Burren" in that county.

HERBULA CESPITALIS, *Schiff.*—Common, and widely distributed on dry pastures throughout Ireland.

ENNYCHIA CINGULATA, *L.*—Very local and rare. Ardrahan (*Miss N.*) and Ballinahinch, Co. Galway; Knocknarea, near Sligo (*R.*); Carrickfergus, Co. Down (*W.*).

ENNYCHIA NIGRATA, *Scop.*—Specimens have been taken at Galway (*C. G. B.*) and Clonbrock (*R. E. D.*); and Magilligan, Co. Derry.

ENNYCHIA OCTOMACULATA, *Fb.*—Fairly abundant, but very restricted in distribution. Kilcornan (*B.*), Ardrahan, and Ballinahinch, Co. Galway; on the banks of the Roughty River, and the valley above Kenmare, Co. Kerry.

AGROTERA NEMORALIS, *Scop.*—Near Sligo (*R.*).

ENDOTRICHA FLAMMEALIS, *Schiff.*—Galway (*B.*).

EURRHYPARA URTICATA, *L.*—Common everywhere.

SCOPULA ALPINALIS, *Schiff.*—Giant's Causeway, Antrim (*E. M. M.* ii. 261).

SCOPULA LUTEALIS, *Hb.*—Often very abundant and widely distributed. Various localities in the counties of Dublin, Louth, Armagh, Derry, Donegal, Sligo, Galway, Westmeath, Tyrone, &c.

SCOPULA OLIVALIS, *Schiff.*—Everywhere abundant.

Scopula prunalis, *Schiff.*—Everywhere abundant.

Scopula ferrugalis, *Hb.*—Abundant on the coast near Dublin (*B.*), as at Howth. The only other localities of occurrence that I know elsewhere are Drumreaske, Monaghan; Favour Royal, Tyrone; and Berehaven, Co. Cork (*Ir. Nat.* iii. 198).

Botys pandalis, *Hb.*—Rare. Galway (*B.*); single specimens at Ardrahan, and Dromoland Castle, Co. Clare; Enniskillen (*Partridge*).

Botys ruralis, *Scop.*—One near Sligo (*McC.*); Cork, very abundant (*S.*).

Botys fuscalis, *Schiff.*—Common everywhere.

Ebulea crocealis, *Hb.*—"Howth, Dublin, Wicklow, Galway" (*B.*).

Ebulea sambucalis, *Schiff.*—Appears to be generally distributed. I, however, have never met with it.

Spilodes sticticalis, *L.*—"Howth, by Dr. Wright" (*B.*).

Pionea forficalis, *L.*—Common universally.

Orobena straminalis, *Hb.*—Abundant locally. Cavan (*B.*); Favour Royal, Tyrone; Enniskillen; at Markree Castle, and near Sligo (*R.*); Cromlyn (*Mrs. B.*), and Killynon, Co. Westmeath; Killarney (*B.*).

Cataclysta lemnata, *L.*—Common everywhere.

Paraponyx stratiotata, *L.*—Widely distributed, but somewhat local. Drumreaske, Monaghan; and very abundant on the Grand Canal near Athy, &c.

Hydrocampa nymphæata, *L.*—Very common.

Hydrocampa stagnata, *Don.*—Very common. Stainton, in his 'Manual,' refers to a pale variety as follows:—"Mr. Bond has specimens of a pale variety in which the inner line and subterminal line are obliterated. They were taken near Cork, and perhaps may be a distinct species." This I have taken on the shores of Lough Oughter at Farnham, Co. Cavan; at Castle Bellingham, Co. Louth; and on the banks of the Brosna where it enters the Shannon in King's Co. It is evidently only a variety, as every grade of obliteration occurs to a pure white form (at Lough Oughter especially), upon which the only markings that remain are traces of the discoidal marks.

Acentropus niveus, *Oliv.*—Occurs in the same locality at Lough Oughter in some abundance. Also is extremely abundant at Belleisle on the Upper Lough Erne; and is also numerous in parts of the Lower Lough below Enniskillen.

PTEROPHORI.

PLATYPTILIA BERTRAMI, *Rössl.*—Widely distributed, but local. Howth (*G. V. H.*), Kingstown, and the "Strawberry-beds" near Lucan, Co. Dublin; Farnham, Co. Cavan; Armagh (*J.*); and local near Belfast (*W.*); Glendalough, in Connemara; near Sligo (*R,*); Coolmore, Co. Donegal (*J.*); Dunmore, Co. Waterford, &c.

PLATYPTILIA ISODACTYLUS, *Zell.*—Local, but abundant in its habitats. Birchall found it sparingly in Cromaglaun Glen, near Tower Lodge, on the Upper Lake of Killarney, in August. It also occurs on the opposite shore, in marshy spots at the foot of the Eagle's Nest Mountain, where I took it in some numbers, in company with W. Salvage, in the first week in June. I have also specimens from Markree Castle, Co. Sligo, and Moycullen, Co. Galway.

PLATYPTILIA GONODACTYLA, *Schiff.* — Howth and Clontarf, Co. Dublin (*B.*); abundant near Belfast (*W.*); Armagh (*J.*). I have specimens from other localities, but unfortunately have lost the label references.

PLATYPTILIA TESSERADACTYLA, *L.*—In June, 1895, I took, at Ardrahan, two plumes which I thought to be like *P. zetterstedti*. The following year, at Clonbrock, in the same county, when in company with the Hon. R. E. Dillon, I met with two species of plumes, in a clearing of a plantation where *Antennaria dioica* grows plentifully. One proved on inspection to be *Aciptilia tetradactyla*, and the other, of which I took a series of five or six, I recognized to be the new species met with at Ardrahan. Mr. Dillon recognized it at once as one which occurred numerously about that clearing, and showed me in his store-boxes a series captured there a year or two before. When sending a box of *Eupitheciæ* and Micro-Lepidoptera to Mr. C. G. Barrett subsequently, I put in a specimen, which was in due course identified by him and Lord Walsingham as *tesseradactyla*, L. A third locality has been discovered this year, namely, Dromoland Castle, Co. Clare, the seat of Lord Inchiquin. It appears, however, to be scarce there, for in the present summer I repeatedly searched considerable areas covered with the food-plant, but in vain; till one evening the Hon. Edward O'Brien caught a single specimen on the edge of a plantation. From the similar character of these three localities, so widely apart, it is probable that many other stony pasturages of the west of Clare and Galway may preserve settlements of this moth, elsewhere unknown in the British Islands. It is easily disturbed from the food-plant on a sunny day. Mr. Dillon and myself transplanted some large sods of the food-plant in the autumn, with the result that he introduced a small colony of these plumes into another part of the Clonbrock demesne. Most of my plants, however, were scratched up by rabbits at Drumreaske, so that probably I have failed in my first attempt at colonization.

AMBLYPTILIA ACANTHODACTYLA, *Hb.*—Near Sligo (*R.*), a light reddish form which Mr. Tutt refers to this species rather than to the *cosmodactyla* of Hübner, which they more nearly approach in colour (*Pterophorina* of Britain). About Belfast they are generally distributed, though rare (*W.*); Wicklow (*G. V. H.*); Killarney (?); see below.

[AMBLYPTILIA COSMODACTYLA, *Hb.*—Birchall records "*punctidactylus*" from Killarney. Probably referable to the above.]

OXYPTILUS PARVIDACTYLUS, *Haw.*—Knocknarea, near Sligo (*R.*); and Carrickfergus, Co. Down, abundant (*W.*).

MIMÆSEOPTILUS BIPUNCTIDACTYLA, *Haw.* (*plagiodactylus*, Sta.).—A very common scabious plume throughout Ireland, where scabious is extremely abundant.

MIMÆSEOPTILUS PTERODACTYLUS, *L.* — Widely spread and common. Kingstown and elsewhere in Co. Dublin. On the coast near Wexford; Cappagh and Dunmore, Co. Waterford; Killarney; Sligo (*R.*); Clogher Head, Co. Louth, &c. Birchall gives "Howth and Belfast," but it is questionable whether this refers to this species or to *Pterophorus monodactylus*, L., of which this was formerly considered a synonym. Mr. Watts has taken it plentifully on Black Mountain, Belfast.

ŒDEMATOPHORUS LITHODACTYLUS, *Tr.*—This species does not seem common in Ireland. Galway, (*B.*); Fermanagh (*G.V.H.*); Queenstown, Co. Cork; Drumreaske, Monaghan.

PTEROPHORUS MONODACTYLUS, *L.*—Everywhere distributed and apparently not solely a convolvulus-feeder, as it is very numerous in many wild barren districts, from which this plant is absent. I have often met with the imago at ivy blossom in October and November, so that it doubtless hybernates.

ACIPTILIA TETRADACTYLA, *L.*—Local, and in some places not uncommon. It is to be found in many localities in the County of Galway, as at Moycullen, Clonbrock, where it flies in some numbers with *Platyptilia tesseradactyla;* Ardrahan, &c. Also not rare at Dromoland Castle, Co. Clare; Island Magee, Co. Down (*W.*); Castle Bellingham, Co. Louth.

ACIPTILIA PENTADACTYLA, *L.*—This insect, so numerous and generally well known in England, is only occasionally taken in Ireland so far as I have experience, and I have never met with it in any numbers. Single specimens for the most part have been taken at various places in the southern half of Ireland, namely, Howth (*S.*); Wicklow Mountains (*B.*); Cappagh, Co. Waterford; New Ross, Wexford (*B.H.*); Cork (*B.*); Kenmare (*R.E.D.*); and the valley of the Roughty, Co. Kerry; Ardrahan and Moycullen, Co. Galway; and near Sligo.

Alucita hexadactyla, *L.*—Everywhere common throughout Ireland, and sometimes extremely numerous, especially in the second emergence.

(To be continued.)

AMONG THE BUTTERFLIES AND FLOWERS OF NORWAY.

By R. S. Standen, F.L.S., F.E.S.

(Concluded from p. 196.)

Shortly before quitting our hospitable friends of Saeterstöen one of our party—I may be allowed to allude to him as the learned and indefatigable Doctor—left us for the far north, for Bosekop in the Alten Fjord, a six days' journey, with I know not what mythological Erebias and Argynnidæ at the end of it. We would have given much to be able to follow him; we knew how we should miss his playful sallies and his erudite conversation; but weighty considerations intervened, and we decided to leave it for a future expedition. The wisdom of this decision was confirmed shortly after, when we heard that most of the good things there were in very poor condition, and we concluded that it is futile to attempt to combine both N. and S. Norway in one excursion.

In the meantime we had still ten days to dispose of before the departure of the inevitable steamer; so we returned to the capital, and spent a most agreeable evening (with relatives of the writer resident there) at Holmen-Kollen, a favourite resort of the citizens on high ground eight miles out of the city, where suppers are supplied and delightful views obtained over the famous Fjord. In the afternoon, after visiting most of the objects of interest, including the Viking ship and the Antiquity and Natural History Museums, my companion had called on Professor Blyth—an authority on mosses. From the bryologic point of view, he suggested Kongswold in the Dovrefjeld, near Snehætten; as this, however, was a three days' journey, we decided to place it in the same category with Bosekop, and eventually hit upon the happy medium of Bolkesjö—a hill resort in Telemarken, about 1700 ft. above sea-level, and some seventy miles W. by S. of Christiania.

There is a perfectly charming deliberation in all the Norwegians do; they are never in a hurry; and so the express train to Kongsberg, *viâ* Drammen, took 4¼ hours to accomplish the fifty miles: thence we went by *stolkjærre*—a terribly rickety conveyance carrying our four portmanteaus and the driver on a sort of protruding platform behind—to Bolkesjö, eighteen miles, in 4½ hours. The road seemed to have been constructed on the bee-line principle; a few yards to right or left would often have made a comparatively level track of a deeply accented switchback, but this would not have been consistent with the hardy Norseman's contempt for obstacles, so we had to do at least half the journey on foot. At five kilometers from Kongsberg we left the broad valley of the Laagen—a large river completely choked in one place by countless logs of floating timber several feet deep—and turned off into a steep and very rough road through the forest, which stretched away for miles apparently on either side, with hardly a break, till we reached our destination. In small clearings here and there *Argynnis selene* and *euphrosyne* were as abundant as at Saeterstöen, and *Colias palæno* var. *lapponica* sailed along over patches of very wet marsh covered with *Eriophorum polystachion*, and a smaller species, probably *alpinum*.

The village of Bolkesjö is most romantically situated on the steep incline of a hill above the very large and—as the Germans would say—*fischreich* lake of Folsjö. On the far side of the lake is a long range of fir-clad hills, rising one behind the other, and culminating in the "Gausta"—a leonine-looking mountain of 6180 ft., broadly streaked with snow. The firs are interrupted here and there with bright green slopes, or low-lying meadows, marvellously rich in colour with sorrel and a bronze-tinted festuca; and when the setting sun, with that indescribable translucency peculiar to these latitudes, threw its glamour over the scene, one lost count of time, and sleep and dreams were only trivial incidents in a long day. So dazzling, and at the same time so entirely restful and satisfying, were these sunsets, that the artist of our party was perpetually tearing his hair into metaphorical shreds at his inability to reproduce them. He had this advantage, however, over his brethren of the net, in that he could pursue his art in the delicious cool of the evening, and might more than once have been seen at work up to half-past ten and eleven o'clock.

At our present elevation—and we could work from 1500 ft. to 4000 ft.—it was not unreasonable to hope for a somewhat different fauna to that of Saeterstöen, at the most 400 ft. above sea-level. The only strangers, however, were the rare *Argynnis frigga*, a mile or more beyond and above the hotel, and *Erebia lappona*, on the rocky slopes of the "Blefjeld," a hill 4000 ft. high. The collecting-ground here was all on an incline at angles of from 30° to 45°, and the forest, although rather less boggy, was more fatiguing than at our first station by reason of the slippery character of the pine-needles and rocks on a slope—and, in my own case, the fatal omission of nails in the boots.

The feeling of exhaustion at the end of one long day there I shall never forget; it taught me at all events one useful lesson, to wit, that age has its very well-defined limits of endurance.

The *Argynnis aphirape* (common here also) was, I find, the var. *ossianus* of Herbst, very distinct in the bright silver blotches of the under side, and little more than half the size of the type, of which I have specimens from Germany. The *palæno* also are all var. *lapponica*, Stgr.

I should like here to make an observation on *Erebia embla*, which does not, however, appear to occur at Bolkesjö. Herr Schöyen states that in 1884, 1886, and 1888 he found it in great abundance at Disenaaen, but that in 1885 and 1887 he saw none at all. From this he naturally argues that it is a constant biennial, which seems remarkably strange, as it is hard to believe that in the course of ages there may not have been an occasional overlapping. One would like to know how it behaves in Lapland, or whether it has been the object of experiment in captivity, and whether other Erebias lie over in the same way.

The flora here was less varied than at Saeterstöen, but many of the same plants were still to the fore; and I may mention two of the more prominent that were omitted in my former paper, *viz.* a fine form of *Geranium pyrenaicum*, common everywhere, and a lovely crimson dog-rose growing, not in hedges as with us, but in isolated bushes, at not infrequent intervals by the roadside. My fellow-traveller (to whose superior botanical knowledge I was always glad to defer in cases of doubt) pronounces it to be *Rosa cinnamomea*. The last year's berries of *Vaccinium oxycoccus*, the true cranberry, were still lying, attached to their stalks, on the top of the mosses among which they grew, and were still juicy and full of refreshing flavour.

Bird-life seemed to be strangely lacking, both in numbers and variety. The only small birds I noted at Saeterstöen were the common sparrow and the house martin. I also saw four young Fringillinæ, with grey speckled breasts and thick beaks, roosting on one of the lower branches of a fir, and should have said they were hawfinches, only Dr. Bowdler Sharpe tells me that this species is only a winter visitor in Norway. They were probably the crossbill, *Loxia curvirostra*, L., which breeds largely in Scandinavia, and does not acquire the crossing in the beak till after three weeks old. Of the ordinary song-birds we heard none, although the breeding season can scarcely have been over when we first arrived. Among larger birds, the grey crow and the magpie were abundant, we saw a few wood pigeons, and heard a corncrake and the green woodpecker. In the forest, close to Bolkesjö, we were frequently startled by the superb capercailzie, *Tetrao urogallus*, L., commonly known as the cock-of-the-wood. When the male bird swoops up from the ground, or from the low branch where he has been sitting, and crashes through the thick foliage, he looks almost as big as a turkey-cock, and the air is filled with the rattling whirr of his big wings. But the female hangs about, looking after her young, and is only languidly alarmed at the apparition of the human biped. On the Blefjeld, which my companion heroically scaled under a blazing sun, he saw ptarmigan, snow bunting, a lark (of which he took one egg, not yet determined), and a tit which he believed to be *Parus norvegicus*.

I hardly dare trust myself to speak of the Diptera. The bare thought of them sets up a sense of urtication from head to foot; but there are only six species for me:—

No. 1. — A big gadfly with apple-green head, fussy and officious—a kind of German "dumme August"—a truly awful buzzer, but an arrant coward if you only fix your eye on him.

No. 2.—A smaller gadfly, less noisy, but with a keen eye to business, prompt and effective, with a proboscis that seems to go right down to the marrow at once.

No. 3.—The most deadly of all; a small dipteron with gauzy grey-speckled wings, and a proboscis like an invisible needle —a furtive and silent pest, that deposits its poison and is off before you know that it has settled.

No. 4.—A handsome, brown-blotched, black and yellow bodied little thing, only a degree less venomous than No. 3.

These are about you in countless swarms all day long, in sunshine and shade alike, and you come home in a state more easily imagined than described. The other two are the homely twilight midge, and the familiar mosquito that hums about your bed at night and counterpoints his melody upon your defenceless brow and hands. And yet, in spite of these torments, which are very real at the time, there is in those vast solitudes—where one may walk for days without meeting a soul—such a sense of freedom, and of the pure enjoyment of nature in one of its grandest forms, and the fascinations of the country and people generally are so great, that all else is soon forgotten, and one is quite ready to renew one's experiences on the first opportunity.

List of Rhopalocera Noted or Taken.

Papilio machaon, L.—A few only, large and fine, at both places.

Aporia cratægi, L.—Abundant, large and strongly veined, at both places.

Pieris brassicæ, L.—Fairly common.

P. rapæ, L.—One or two noted.

Euchloë cardamines, L.—Common.

Leucophasia sinapis, L.—Very common.

Colias palæno var. *lapponica*, Stgr.—Abundant, both at Saeterstöen and Bolkesjö.

Thecla rubi, L.—Common.

Polyommatus hippothoë, L. and Esper.—A few on the railway bank.

P. phlœas, L.—Common.

P. amphidamas, E.—One only, on railway bank.

Lycæna ægon, Schiff.—Common.

L. argus, L.—One male only, on railway bank; dark slate ground colour on under side.

L. optilete, Knock.—Fairly abundant about its food-plant, *Vaccinium uliginosum*, both at Saeterstöen and Bolkesjö.

L. icarus, Rott.—Only one or two; a more metallic blue than the English or continental type. Railway bank at Saeterstöen.

L. amanda, Hb.—Rare at Saeterstöen.

L. argiolus, L.—A few very worn.

L. semiargus, Rott.—Very abundant.

L. cyllarus, Rott.—A few, both at Saeterstöen and Bolkesjö.

Vanessa c-album, L.—One only, very worn, railway bank.

V. urticæ, L.—One or two only of last year's brood.

V. antiopa, L.—A few well-battered specimens at Saeterstöen.

Melitæa athalia, Rott.—Abundant and strongly marked.

Argynnis aglaia, L.—One or two noted at Bolkesjö.

A. euphrosyne, L.—Very abundant everywhere, but not so finely marked as Swiss specimens.

A. selene, Schiff.—Equally common in both places. The railway bank swarmed with them.

A. aphirape var. *ossianus*, Hbst.—Abundant both at Saeterstöen and Bolkesjö. Much smaller than the type, specimens of which I have from Germany without the silver blotches on the under side.

A. freija, Thnb.—One only, at Disenaaen, worn.

A. frigga, Thnb.—Seven or eight, in poor condition, in a clearing of the forest a mile or so above Bolkesjö.

Erebia lappona, E.—Only one, in good condition, on the Blefjeld, about 3500 ft. up.

E. embla, Thnb.—Abundant at Disenaaen and Saeterstöen, but mostly in bad condition, especially the males. This insect did not occur at Bolkesjö, and appears to frequent low-lying marshes only.

Œneis jutta, Hb.—Rather more abundant than the foregoing, and flying about with it, but although, up to the last, we continued to take now and then a freshly emerged example—especially above Bolkesjö, nearly 3000 ft. up—the great majority were sadly worn.

Pararge hiera, Fab.—Common at both places, very small at Saeterstöen, and at both much darker than the Swiss type.

P. egeria var. *egerides*, Stgr.—At Saeterstöen only. Rare.

Epinephele hyperanthus, L.—A few only, and of a rather remarkable form, most of the specimens showing a tendency to approach the aberration *arete* of Ochsenheimer—almost black on the upper side, with the eye-markings of the type entirely effaced; on the under side a slaty grey, with the pupils of the fore wing only faintly visible. This species was taken at both Saeterstöen and Bolkesjö.

Cœnonympha pamphilus, L.—Very common.

C. typhon, Rott.—Fairly common both at Saeterstöen and Bolkesjö.

Syrichthus centaureæ, Rbr.—Moderately common on the big bog at Saeterstöen, but not in the best condition.

S. malvæ, L.—Common.

Nisionades tages, L.—A few.
Hesperia sylvanus, E.—A few.

N.B.—For *A. freija*, *A. frigga*, *E. embla*, and *Œ. jutta* the collector should be on the ground not later than June 10th.

Thorpe Hall, Colchester: August, 1898.

Since writing the above I have been much grieved to hear of the rather sudden and unexpected death of Professor Blyth, who had broken his leg shortly before we reached Christiania, but was said to be rapidly recovering.—R. S. S.

THE NORTH AMERICAN BEES OF THE GENUS *PROSAPIS*.

By T. D. A. Cockerell, N. M. Agr. Exp. Sta.

(Continued from p. 192.)

Florida.—*P. schwarzii* was described from a large female taken by Mr. Schwarz; but I have several examples from Mr. Robertson, indicating that the insect varies in size. Mr. Robertson kindly sends me also the male, which is a remarkable insect; the face-marks are cream-colour, the lateral marks long and narrow, pointed at each end, the inner side squarely truncate a little above the level of the top of the clypeus, the further projection along the orbital margin being narrow. The upper margin of the clypeus is broadly black, and there is a short black median downward projection, and long narrow lateral black stripes, separating the light colour of the clypeus from the lateral marks. There is no supra-clypeal mark. The first abdominal segment is smooth, practically impunctate. The punctuation of the thorax is fine and close, not coarse as in *confluens*. Antennæ, hind border of prothorax (except spot on tubercles) and tegulæ wholly dark. Wings strongly infuscated as in the female.

In lacking a supra-clypeal mark in the male, this is like *nevadensis*, but in all other respects that is a totally different insect. It had been formerly questioned whether it might be *confluens* or *elliptica*, but it is in fact wholly distinct from either of them.

I have before me also types of *P. floridana*, Rob., and *P. flammipes*, Rob., both from Florida.

Louisiana.—In Coll. Am. Ent. Soc. is a small male, which I can only refer to *modesta*, though one would not look for that species so far south. It is not in the best condition, but it seems to present no good distinctive features.

Texas.—Three specimens are in Coll. Am. Ent. Soc., two in U. S. N. M. Of the former, a male is to be referred to *citrinifrons*, though the face is buff instead of lemon-yellow, and there is yellow on the hind border of prothorax. It might be taken for *modesta*, but for its strongly punctured first abdominal segment, the punctuation being closer than in typical *citrinifrons*. It is, perhaps, a new species, but more evidence is needed before describing it as such.

All the other Texas specimens are females. They are rather large, with the lateral marks constituting broad triangles as in *modesta*, but quite long, rather as in *floridana*, yellow on hind border of prothorax, on tubercles, and spots on tegulæ; first abdominal segment smooth. One differs by having all the light markings pure white; it is probably a variety. It hardly seems likely that this is the female of *citrinifrons*, but I am not prepared to describe it as new.

New Mexico.—In the Mesilla Valley, 3800 ft., we find two species: *mesillæ*, allied to the eastern *pygmæa;* and *asinina*, quite distinct from other U. S. species, and probably of Mexican affinities. The female of *asinina*, described as *bipes*, was first taken in September; it occurs on *Solidago*. This form has yellow face-markings; but in May, Miss Jessie Casad took specimens on mesquite (*Prosopis*) which were somewhat larger, and had the markings so pale as to be practically white. *P. mesillæ*, described from specimens taken in August, also occurs in spring, as early as April, on *Sisymbrium*, &c. On June 30th I took *mesillæ* at Albuquerque. A female taken on *Salix* at Santa Fé, July, appears to be *pygmæa*, agreeing with the Colorado females so referred. It has not the light clypeal spot of *mesillæ*, and the lateral marks are smaller. *P. rudbeckiæ* was originally described from Sta. Fé. On a crucifer on Tuerto Mtn. near Sta. Fé, at 8550 ft., August 7th, I took a female differing from any seen at Sta. Fé (7000 ft.), and quite similar to *varifrons* female, except for the strongly and closely punctured first abdominal segment. The tegulæ have a light spot. This is clearly distinct from any female *Prosapis* described, but I will not propose a name for it, as it probably belongs to one of the described males.

On *Monarda fistulosa* at Monument Rock, Sta. Fé Cañon, 8000 ft., August 11th, I took a female *varifrons*. It has the wings rather darker than usual, and so looks like the Florida *schwarzii*.

Prof. E. O. Wooton took a remarkable series of *Prosapis* on *Scrophularia*, Ruidoso Creek, 7500 ft. From the males of this lot were described *P. wootoni*, *P. tridentula* (also Colo.), and *P. rudbeckiæ* race *ruidosensis*. The females are of two types—one like *varifrons*, the other like *modesta;* the former has, the latter lacks, the spot on tegulæ. In both the first segment of the abdomen is smooth. I infer, but cannot assert, that the *varifrons*-

like female belongs to *tridentula*, and the *modesta*-like one to *wootoni*.

COLORADO.—Mr. C. F. Baker has collected a surprising number of species, showing apparently that the higher elevations in this State are the metropolis of the genus in the U. S. From the males I have described *P. bakeri* (7000 ft.), *citrinifrons* (8500 ft.), *tridentula* (9500 ft.), *rugosula* and var. *fallax* (9500 ft.), *tridens* (7000 ft.), *divergens* (7000 ft.), *episcopalis*, *coloradensis* (9500 ft.), *digitata*, and *rudbeckiæ* race *subdigitata*. I have also recognised amongst Mr. Baker's Colorado material the described species *basalis*, Sm., *varifrons*, Cr., and *pygmæa*, Cr. I have taken *P. mesillæ*, Ckll., on *Cleome serrulata* at La Junta, Colo., but that is on the plains. *P. affinis*, *modesta*, *elliptica*, and *verticalis* have been recorded from Colorado; *elliptica* is probably found there; but the others have probably been erroneously identified from such allied forms as *citrinifrons*, *tridentula*, &c. In the U. S. N. M. is a specimen taken by the writer in Custer Co., Colo., a female. It is of the *varifrons* type, but has a broken pale band on anterior edge of clypeus. The tegulæ have a light spot. I suppose it is *varifrons*, but it approaches *elliptica*.

MONTANA.—The U. S. N. M. contains two females of the *varifrons* type, presumably that species. Both have the hind border of prothorax dark, and the spot on tegulæ.

UTAH.—The Coll. Am. Ent. Soc. contains male *varifrons* and female *basalis*.

IDAHO.—The U. S. N. M. contains two female *varifrons*, collected by Prof. L. Bruner in Beaver Cañon. One has the hind border of prothorax partly light, the other has it all dark; the latter lacks the spot on tegulæ.

NEVADA. — Two species, *suffusa* and *nevadensis*, are known only from Nevada. A female from Nevada, in Coll. Am. Ent. Soc., is of the *varifrons* type, with spots on tegulæ, but there is a large rufescent patch on the anterior part of the clypeus. The first abdominal segment is smooth.

CALIFORNIA.—*P. coquillettii* is a distinct species from Los Angeles Co. A female collected by Coquillett, also in Los Angeles Co., seems to belong to it; it has the lateral face-marks much as in *varifrons*, only shortened and abruptly rounded above. The anterior part of the clypeus is obscurely rufescent.

Male specimens from Cala. in Coll. Am. Ent. Soc. represent four species, thus:—

(1.) *P. bakeri*, Ckll. With all the distinctive characters of this well-marked species, but the wings are browner than in the type.

(2.) *P. ruidosensis*, Ckll., var. with spot on tegulæ. One of the slightly modified *rudbeckiæ* types; from a single specimen we cannot determine whether there exists a distinctive Californian race.

(3.) *P. suffusa*, Ckll., var. with the face more lemon-yellow. The abdomen is strongly punctured. Tegulæ all dark; tubercles with a yellow speck.

(4.) *P. tridentula*, Ckll. The clypeus is somewhat shorter than in the Colo. type.

A female, which I can only refer to *P. mesillæ*, is in the U. S. N. M. from Los Angeles Co., collected by Coquillett.

In Coll. Am. Ent. Soc. are several examples of a remarkable female form, with the lateral face-marks triangular, quite broad and short, rather of the *modesta* type, but the clypeus with a broad yellow vertical stripe, or even wholly yellow except the sides, which may then become rufescent. The tubercles are light, and the tegulæ have a spot. I had held this to be the hitherto unknown female of *bakeri*, but I do not find it among Mr. Baker's Colorado collections.

A female from Placer Co., Aug. (A. Koebele), in U. S. N. M., is of *varifrons* type, but the lateral face-marks are reduced to mere specks. The tubercles have a yellow spot, with a black speck on it, but the tegulæ are wholly dark. The wings are tinged brownish. A female in Coll. Am. Ent. Soc. looks like *varifrons*. The tegulæ have a very small obscure spot.

OREGON.—There is a male *P. divergens* in Coll. Am. Ent. Soc.; it differs a little from the Colorado type, but is hardly to be described as a distinct variety, I think.

WASHINGTON STATE.—A male *mesillæ* is in Coll. Am. Ent. Soc.; I was quite surprised to see it from so far north. As shown above, this species is also found in Cala.

VANCOUVER I.—The Coll. Am. Ent. Soc. contains a male *P. citrinifrons* and a couple of female *basalis;* also a female of the *varifrons* type, with dark tegulæ, like the Californian form mentioned above

MEXICO.—I have before me males of *mexicana* and *grossa*, sent by Mr. Baker. Cresson describes *azteca*, *dubiosa*, *mexicana*, and *grossa*, all obtained by Sumichrast at Orizaba. Smith's *maculipennis* and *trepanda* are from Oajaca.

It will be seen from the above review how little we know about the females of N. American *Prosapis*. It is evident that the numerous females of the *varifrons* type, which might be thought to belong to a single species, almost certainly should be referred to several species having easily recognisable features in the male.

(To be continued.)

NOTES AND OBSERVATIONS.

Rapid Metamorphosis of Drepana falcataria (Platypteryx falcula). —On Saturday, July 9th, I found a few full-grown larvæ of *Platypteryx falcula* on Wimbledon Common, and by Saturday morning, July 23rd, two of the imagines had emerged, taking a few hours less than a fortnight in changing from larva to imago. They were kept in the house in a glass cylinder, and I did not remove the pupæ until a day or two before the perfect insects came out.—A. W. Mera; 79, Capel Road, Forest Gate.

Lepidoptera at Sea.—Yesterday and to-day the ship has been swarming with *Nomophila noctuella.* I have seen them every day since we left Gibraltar on the 11th inst., but it is only since yesterday that they have appeared in such large numbers. The weather during our cruise has been almost perfectly calm, and what little breeze we have occasionally had has been from the south-east. Yesterday, at noon, the nearest land, Cape Caccia, Sardinia, was eighty-two miles north-east of us, and this morning at eight o'clock we were some twenty-five miles north of Corsica. Besides this species I have noticed several *Pyrameis cardui*, *Macroglossa stellatarum*, *Plusia gamma*, and *Scopula ferrugalis.* We arrived at this place at four this afternoon.—Gervase F. Mathew, H.M.S. 'Hawke,' Leghorn, Aug. 16th, 1898.

CAPTURES AND FIELD REPORTS.

Acidalia herbariata.—On the afternoon of July 21st last I caught a beautiful specimen of this insect at rest on the wall inside a shop in Southampton Row, Bloomsbury.—Selwyn Image; 6, Southampton Street, Bloomsbury, W.C., Aug. 8th, 1898.

[*Acidalia herbariata* was included by Stainton in his 'Manual' on the strength of "a specimen taken near Bedford Square," which at the time (1859) was in "Mr. Hunter's collection." In 1869 Mr. E. G. Meek (Ent. Mo. Mag.) records the capture of "three or four specimens." These were taken in the month of June in a herbalist's shop in Holborn. Ten years later Mr. Coverdale, on July 22nd, found one example "in fine fresh condition" resting on a door-post in Cannon Street (Entom. xii. 226). There was a specimen in the late Mr. Wellman's collection, which was sold at Stevens's auction rooms on July 10th, 1894, noted in the catalogue as having been taken on a shop-window in Oxford Street in 1873. So far as can be ascertained by a rather hasty search through our journals, &c., the foregoing are all the British *A. herbariata* about which we have any direct information. Of the "three or four specimens" taken in Holborn, two, we are told, went into the collection of the late Mr. Bond, and one was a worn female. Then we have the three specimens that were contained in the collection of the late Rev. H. Burney, sold at Stevens's in November, 1893, and the Coverdale and Wellman examples—making a total, in all, of nine specimens. Mr. Tutt, however, in his 'British Moths,' p. 243, referring to *A. herbariata*, states: "Perhaps all the known British specimens do not amount to more than six, of which three, caught by Mr. Coverdale in Cannon Street, are in my own collection." The most complete life-history of this species we have any knowledge of is that by Dr. Heylaerts (Ann. Ent. Belg. xxi. pp. 5–8). The eggs, securely fastened on the dry or withered plants upon which the larvæ feed, were deposited at the end of June; the larvæ hatched out early in August, continued to feed through autumn, winter, and following spring; commenced to pupate towards the middle of May, and the imagines emerged in June and July. There were four moults; the first change took place about the middle of September, the second early in November, the third on December 20th, and the fourth early in April. Dr. Sorhagen (Berl. Ent. Zeit. xxv. p. 17) states that from larvæ obtained in April perfect insects were produced in May. Guenée remarks that the larva appears to have been only met with in herb or drug stores, and that the imago occurs in gardens and houses in July and August.—ED.]

COLIAS EDUSA IN DECEMBER.—A few days ago a young friend of mine showed me a rather large male example of *C. edusa* in good condition which he informed me he had taken at St. Leonards in the second week of December, 1896. He was going to school one morning, when he perceived the butterfly hovering over the snow by the side of the road, apparently seeking some resting place; and secured it without any trouble, as it seemed in a somewhat dazed condition. — H. W. SHEPHEARD-WALWYN; Bidborough, Tunbridge Wells.

EUPITHECIA VENOSATA AND DIANTHŒCIA CUCUBALI AT BALHAM.—Referring to Mr. South's note (*ante*, p. 197) respecting *C. venosata* occurring at Balham, I may mention that larvæ of this species and also larvæ of *Dianthœcia cucubali* occur at Balham amongst *Silene inflata.* I only noticed the former last year for the first time, but larvæ of *D. cucubali* I have taken there on and off for the last ten years. On the other hand, the larva of *D. carpophaga*, usually the commonest on *S. inflata*, I have never met with at Balham, although it occurs near by, at Streatham.—H. ROBSON; 135, Louisville Road, Upper Tooting.

HESPERIA LINEOLA NEAR BEDFORD. — On July 25th, when collecting outside some woods about two miles from Bedford, I took half a dozen small skippers. Of these five are *Hesperia thaumas*, but the sixth has been identified by the Rev. G. H. Raynor as being undoubtedly *H. lineola.*—E. A. S. HATTON; Ullesthorpe, St. Michael's Road, Bedford, Aug. 15th, 1898.

COLLECTING IN SOUTH-EAST KENT. — On July 2nd I left London for a short tour to Hythe, *viâ* Hastings, Ore, Rye, Appledore, and Ashford; and I visited Shorncliffe, Sandgate, Saltwood, Lymne, and Folkestone while staying at Hythe. The weather was exceptionally fine, and although I cannot record many rare captures, I obtained one hundred and thirteen different species, twenty.seven being butterflies. The following is a list of the more important captures, with localities, &c.:—*Gonepteryx rhamni*, Hythe and Appledore (pupæ). *Argynnis aglaia*, Hythe (larvæ). *A. adippe*, Hythe and Appledore. *A. selene*, Hastings, Fairlight Glen (plentiful). *A. euphrosyne*, Hastings (plentiful). *Vanessa cardui*, Cheriton, Folkestone (hybernated). *Melanargia galatea*, Hythe (pupæ, obtained by sweeping). *Thecla quercus*, Appledore (in distant oak wood). *Lycæna bellargus*, Cheriton, Folkestone. *L. argiolus*, Rye. *L. minima*, Warren, Folkestone (plentiful). *Syrichthus malvæ*, Appledore and Folkestone. *Nisoniades* *tages*, Ore, and the Warren, Folkestone. *Hesperia thaumas*, Appledore. *Sphinx ligustri*, Hythe (at rest). *Chærocampa porcellus*, Appledore (came to light). *C. elpenor*, Appledore (came to light). *Smerinthus populi*, Hastings (at rest). *Trochilium crabroniformis*, Appledore (plentiful in an osier-bed). *Sesia tipuliformis*, Appledore (in a garden). *Zygæna loniceræ*, the Warren, Folkestone. *Zygæna filipendulæ*, Appledore, and Warren, Folkestone (pupæ, plentiful); var. *hippocrepidis*, Appledore (pupæ): I obtained seven specimens of this variety from among about 220 pupæ of *Z. filipendulæ*, which were set at liberty as they emerged. *Earias chlorana*, Appledore (sparsely, in osier-beds). *Nudaria senex*, Appledore (on the marsh, very plentiful). *Lithosia muscerda*, Appledore (on the marsh). *Spilosoma urticæ*, Appledore (by the canal). *Zeuzera pyrina*, Lymne, Hythe. *Leucoma salicis*, Appledore (very common, in all stages). *Bombyx rubi*, Ashford. *Dicranura furcula*, Appledore (osier-bed, larva). *D. vinula*, Appledore (larvæ). *Lophopteryx camelina*, Saltwood, Hythe. *Notodonta ziczac*, Appledore (larva). *Acronycta tridens*, Appledore (at rest). *A. aceris*, Sandgate (male and female, pairing). *Leucania pallens*, Shorncliffe (disturbed while sweeping). *Hadena oleracea*, Appledore. *Anarta myrtilli*, Ashford (flying outside station). *Euclidia glyphica*, the Warren, Folkestone (plentiful). *Catocala nupta*, Sandgate (larvæ). *Pericallia syringaria*, in a wood near Ashford. *Geometra papilionaria*, Lymne, Hythe. *Acidalia inornata*, Appledore (male and female). *A. imitaria*, Hythe (plentiful). *Timandra amataria*, Hythe (plentiful). *Eupithecia rectangulata*, Shorncliffe (plentiful). *Anticlea cucullata*, Hythe (West), (four males and one female). *Cidaria associata*, Appledore and Folkestone. Sugaring seemed to be of no service this year; the best insects were mostly taken by casual searching in the day. Insects came well to light, but there were no particularly rare species, excepting *C. porcellus*. Sweeping on Romney Marshes was fairly profitable; though the best insects taken were the pupæ of *M. galatea*. A collector I met informed me that he had seen *Apatura iris* in a small wood at the back of Hythe in 1897.—LINDEN HEITLAND; Amberley House, Crouch Hill, London, N., Aug. 12th, 1898.

MACROGLOSSA BOMBYLIFORMIS, Ochs. (=FUCIFORMIS, Staint. Newm.) AT OXSHOTT.—On August 13th last I found twelve larvæ of this species on an isolated patch of honeysuckle growing among the heahter a short distance from Oxshott station. They were mostly full grown. About a mile further on a much larger quantity of honeysuckle was met with but although this was closely examined only one larva of *M. bombyliformis* was detected. In walking through the heather and bracken *Plusia gamma* darted up in front of one at almost every step.—RICHARD SOUTH, 100, Ritherdon Road, Upper Tooting.

A PLAGUE OF WHITE BUTTERFLIES.—For several days past the gardens here have been infested with the greatest plague of these I have ever yet seen; nine-tenths of them being *Pieris rapæ*. With a view of reducing the crop of caterpillars later on, I have kept a boy almost constantly going with the net. During the last two days he totalled 268 of them, on one occasion he took five at one stroke. At present there is but little diminution in their numbers. — GEORGE WALL; Grim's Dyke; Harrow Weald, Aug. 18th, 1898.

LEUCOMA SALICIS IN LONDON DISTRICT.—On July 7th last I found two larvæ of *L. salicis* on a poplar tree on Wandsworth Common; both subsequently proved to be ichneumoned. Mr. Armstrong, who collected in the district referred to between the years 1860 and 1872, informs me that the species used to be abundant both on the common and in Battersea Park.—Richard South.

Eurrhypara urticata feeding on Mint.—In September, 1897, I found a number of the larvæ of this species on garden mint in this neighbourhood. They hybernated in cocoons in the usual way, and did not pupate until about three weeks before the perfect insect emerged, which latter event occurred early in July of the present year.—Richard South.

Dianthœcia capsincola.—Larvæ of this species have been unusually abundant this year on sweet-william in the garden here. Almost every seed-head was tenanted. Considered from an economic point of view, *D. capsincola* should probably be included among injurious insects.—Richard South; Upper Tooting, S.W.

SOCIETIES.

South London Entomological and Natural History Society.—The meetings, which have been suspended during August on account of redecorating rooms, will be resumed on Thursday, September 8th, and continued on the subsequent second and fourth Thursdays in each month as heretofore.

Kendal Entomological Society.—*August 8th*, 1898.—Rev. A. M. Moss, President, in the chair. The meeting was well attended, twenty-two being present, and six new members were elected, bringing the roll of membership up to the encouraging figure of thirty-six. The chief business of the evening was to discuss the district to be worked by the Society, and this with a view to forming a model museum collection, together with a reliable, up-to-date list of the Macro-Lepidoptera of the adjoining country. Such an undertaking, it was felt, would be of invaluable aid and interest to all, if restricted to a limited area. From the geological nature of the country it was seen at once that county boundaries could not be adhered to, so it was resolved that the district recognized by the Society should include a radius of twenty miles round Kendal. The district, therefore, while comprising nearly the whole of Westmoreland, takes in also parts of Cumberland, Yorkshire, and North Lancashire. It was also resolved that, in the event of a local species being found a few miles beyond the assigned district, and yet in more or less similar country, it should be recorded; the only condition being that the precise locality be given. Mr. Holmes exhibited series of *Argynnis aglaia*, *A. adippe*, *Erebia epiphron*, *Lycæna ægon*, and *L. salmacis*, one specimen of the latter, a female, showing the orange spots on the right side much lighter than on the left; it was noticed by several that the females of *L. ægon* taken this year on Brigsteer Moss are smaller than those taken last year. Mr. Moss, larvæ and pupæ of *Nemeobius lucina*, bred from ova,; also drawers of Nymphalidæ and Satyridæ, and box of recent captures &c., embracing vars. of *Aplecta herbida* and bred species of

Noctua triangulum and *Triphæna fimbria*. Mr. Smith, *Platypteryx lacertula*, *P. falcula*, and some fine forms of female *L. alexis*; also a variety of *Cœnonympha davus*, male, dark bronze with unequal splashes of light colour. Mr. Wright, recently caught *A. aglaia* and *A. adippe*.—Arthur Miles Moss, *Sec.*; 12, Greenside, Kendal.

Birmingham Entomological Society.—*July* 18*th*, 1898.—Mr. A. H. Martineau in the chair. The chairman showed larvæ of *Dytiscus marginalis* from Ribbesford; also a *Nematus* one antenna of which had a white ring near the tip and the other was all black; he believed it to be gynandromorphous. Mr. Bradley, *Megachile willughbiella* and *M. centuncularis*, male and female of both, obtained from a post near Sutton. Mr. W. Bowater, a specimen of *Odynerus pictus* which had made its nest behind a picture in his bedroom at Edgbaston. The cells, which were broken, contained about three dozen larvæ of one of the sawflies. Mr. Willoughby Ellis recorded the occurrence, at Haywood near Solihull, of *Strangalia armata*, *Pterostichus striola*, *Aphodius fossor*, *Clythra quadripunctata*, *Melanotus rufipes*, and *Serica brunnea*, the last occurring on sugar.—Colbran J. Wainwright, *Hon. Sec.*

RECENT LITERATURE.

Fauna Regni Hungariæ. III. Arthropoda-Hemiptera. Conscripsit Dr. G. Horvath (subordo Aptera a R. Kohaut). Reg. Soc. Sci. Natur. Hungarica. Budapest, 1897. [Editio separata.]

The thousandth anniversary, last year, of the founding of the Hungarian monarchy has been commemorated by Hungarian zoologists in the publication of a series of catalogues of the fauna of their country. Dr. Horváth has been good enough to send me his contribution on the Rhynchota. I call attention to it in the 'Entomologist' as it seems to me to be well worthy of serving as a model for future faunistic catalogues. It is preceded by an historical preface in Magyar and Latin (in parallel columns), and a bibliography of one hundred and ninety-nine papers, of which Dr. Horváth himself has contributed eighty. Appended is a coloured map, divided into eight numbered sections, referred to in the list of species under the numbers. British rhynchotists will be interested to note that 1643 species (including Mallophaga, &c.) are recorded; of these 814 belong to the Heteroptera, a suborder of which we have only about 440 species in the British Isles. Of the Auchenorhynchous Homoptera and Psyllidæ 502 are enumerated, our British list numbering 200 less.

Dr. Horváth is always so refreshingly up to date in his nomenclature, that it seems captious to note a slight error on page 31 in the enumeration of the Gerrididæ (a name which the distinguished author rightly substitutes for the usual "Hydrometridæ"), *viz.* the correct name of *Gerris costæ*, Herrich-Schäffer, is *G. lateralis*, Schummel, the latter having twenty-four years' priority.

G. W. Kirkaldy.

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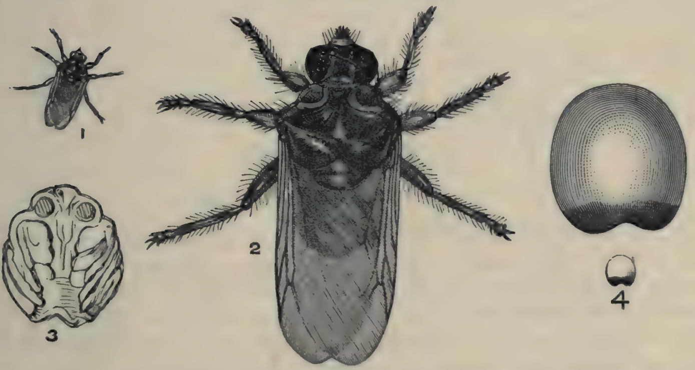
HIPPOBOSCA EQUINA, LINN., AT YSTALYFERA, GLAMORGANSHIRE.

By ELEANOR A. ORMEROD, F.E.S.



HIPPOBOSCA EQUINA, 1 and 2, nat. size and magnified from life; 3, pupa removed from egg-like puparium (after Réaumur); 4, puparium, nat. size and magnified, before complete colouration.

ON August 18th I received a letter from Dr. D. Thomas (Medical Officer of Health) from Tyr-waun, Ystalyfera, Glamorganshire, South Wales, asking my opinion on some specimens enclosed, of which he observed that "they are known in this district as 'Forest Flies.' They are a perfect terror to horses, some animals becoming quite beyond control. Fortunately, according to my experience, they are not very frequently met with. I have generally found them in the parish of Ystradgynlais in Breconshire, among hillside farms, where there is plenty of scrubby timber."

The specimens sent me by Dr. Thomas were obviously (and at a glance) our "Forest Fly," the special pest of the New Forest, of which I saw only too many in the year 1895, when the circumstance of the autumn manœuvres being in that district brought the habits of the pest under special observation; and careful comparison, both with descriptions and types, showed these specimens, now sent by Dr. Thomas, to be *Hippobosca equina*, Linn.

Thus, in addition to the English head-quarters of the species in the New Forest in Hampshire, we have the subordinate localities of the valley between Portmadoc and Beddgelert in North Wales, from which I received specimens in 1895, taken by the driver of one of the coaches off one of the horses going to and fro between the above localities; also the Ystalyfera locality, from which specimens have now been sent. And as Dr. Thomas mentions having "*generally*" found this fly (of which he now sends samples from Ystalyfera) in the parish of Ystradgynlais in Breconshire, this might, I think, be fairly considered as yet another locality.

Torrington House, St. Albans: Sept. 1898.

A NEW SPECIES OF *CHARAXES*.

By Percy I. Lathy.

Charaxes gamma, sp. nov.

♂. Fore wings blackish brown. Just beyond cell crossed by a series of five pale yellow spots, the first being just above first median nervule, the second minute and nearer hind margin, between first and second median nervules; the remaining three larger, the third being between second and third median nervules; and the fourth and fifth, which adjoin, between the third median nervule and submedian nervure. Beyond this series, and in the same position to the nervules, are five more pale yellow spots, arranged in a straight line, all of which but the second are smaller; above and on each side of the upper spot of this series are two pale yellow spots, so placed that they form, with the five, a Y; the lower of the two spots forming the branch of Y next hind margin minute; hind margin faintly yellowish between nervules. Hind wings blackish brown; a pale yellow band across the middle, extending from costa to first median nervule. A series of submarginal pale yellow markings, of which the upper are large and round, the two next anal angle being mere lines; within these submarginal markings three dull greenish yellow lunules, situated respectively between first and second and second and third median nervules, and third median nervule and submedian nervure; hind margin faintly yellowish between nervules. Antennæ black, end of club orange-brown. Under side: Fore wings silvery; a conspicuous dark olive-brown band crossing cell near base, another dark band just beyond crossing whole fore wing; beyond this band a pale area, where the markings of the upper side, particularly those near inner margin, may be distinguished; within this pale area a large inverted triangular olive-brown marking, the apex being situated on lower discoidal nervule and the base on costa; close to the side of this triangle next the base are three small black spots, of which the upper is nearer the base than the second, and the second nearer than the third; also within pale area is a wide olive-brown band, inwardly broadly bordered with blackish, extending from second median nervule to inner margin; a black lunular mark just beyond cell, and two black lines between first and second median nervules; hind margin broadly bordered with olive-brown, paler inwardly, and with two indistinct silvery spots near anal angle. Hind wings silvery; an irregular black line commencing on costa near base, crossing cell, and turning off sharply towards inner margin on third median nervule; another somewhat similar line beyond, terminating about midway between anal angle and base; space between these two lines above costal nervure olive-brown; lower portion of cell filled in with olive-brown; a black mark at end of cell. Beyond silvery basal area an irregular olive-brown band crosses the wings, within this band four dark reddish lunules, inwardly edged with silvery blue and black, outwardly bordered with black; the first of these lunules is just below costal nervure, the second and third respectively between first and second and second and third median nervules. Below upper red lunule a large silvery spot centered with olive-brown, and bordered inwardly with black; a black spot below, and again below this a black streak with a minute silvery blue spot at its inner end; close to hind margin a series of seven dull orange markings, bordered inwardly with first a black line, then a silvery lunule; hind margin olive-brown; a silvery blue streak along upper tail. Exp. 2½ in.

Hab. New Caledonia ?. In Coll. H. J. Adams.

Mr. Adams has just received a single specimen of this very distinct new *Charaxes.* It came from Mr. Watkins, of Eastbourne, who obtained it in a mixed collection, and could not be positive as to locality, though he believed it to have come from New Caledonia.* This species has no very near ally in the genus; its place appears to be next *C. epigenes*, Godm. and Salv.; it, however, differs from this species in its falcate fore wings, which resemble in shape those of *C. pyrrhus*, Linn. Besides the shape of the fore wings, it may be distinguished from *C. epigenes* by the yellow band of the hind wings. From *C. caphontis*, Hew., an allied species, it may be distinguished by the absence of the red discal markings of the hind wings.

Lynton Villa, Sydney Road, Enfield: Aug. 15th, 1898.

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* Mr. Watkins has since written me that he has confirmed New Caledonia as the locality for this *Charaxes.*

THE FEMALE OF *CHARAXES FERVENS*, Butl.

By Percy I. Lathy.

Very closely allied to *C. harpax*, Feld. The yellowish white bands of both wings wider, that of the fore wings extending nearly to anal angle, and of the hind wings terminating on second median nervule. The markings of the under side more distinct.

Hab. Nias. In Coll. H. J. Adams.

Dr. Butler, in his "Account of the Butterflies of the Genus *Charaxes* in the Collection of the British Museum" ('Journal' of the Linnean Society (Zoology), vol. xxv. No. 163, p. 396), describes a male of this species, and places it between *C. mars*, Stgr., and *C. affinis*, Butl. Now that the female is known, its position must be altered, its place being in front of *C. harpax*, Feld.

Lynton Villa, Sydney Road, Enfield: Aug. 15th, 1898.

HETEROCERA OCCURRING IN BRITAIN AND JAPAN.

By Richard South.

SPHINGES.

Sphingidæ.

Acherontia atropos, Linn.—Is represented in Japan by a form described by Dr. Butler as *medusa*, in which the abdominal bands and stripes are narrower.

Sphinx convolvuli, Linn. (= *orientalis*, Butl.).

S. pinastri, Linn.—Japanese specimens are mostly referable to the dark form *caligineus*, Butl.

S. ligustri, Linn. (= *constricta*, Butl.).

Deilephila galii, Schiff.

Chœrocampa elpenor, Linn.—Three slight aberrations of this species have been named respectively *macromera*, *fraterna*, and *lewisii* by Dr. Butler.

Smerinthus ocellatus, Linn. (= *planus*, Walk. = *argus*, Mén.).

S. tiliæ, Linn.—Represented in Japan by *S. christophi*, Staud.

Macroglossa stellatarum, Linn.—Common.

Macroglossa (*Hemaris*) *fuciformis* and *bombyliformis* are represented in Japan by very closely-allied species.

SESIIDÆ.

Trochilium, *Sciapteron*, and *Sesia* are each represented, but by East Asian species only; and the same remark applies to the genera *Ino* and *Zygæna* in the Zygænidæ.

BOMBYCES.

NYCTEOLIDÆ.

SAROTHRIPUS UNDULANUS, Hübn.—The examples of this species in Mr. Leech's collection are of the ashy-grey form *russiana*, Dup.

EARIAS CHLORANA, Linn.—Is represented in Japan by *E. pudicana*, Staud., which has fringes of fore wings reddish-brown, and the basal half of costal area is sometimes tinged with pinkish.

HYLOPHILA PRASINANA, Linn.—A form of this species, with costa and inner margin of fore wings yellow and with red-spotted fringes, has been named *sylpha* by Dr. Butler. Examples of this form occur in Europe as well as in Japan; the typical form is found in the latter country also.

NOLIDÆ.

NOLA CONFUSALIS, H.-S.

N. ALBULALIS, Hübn.

N. CENTONALIS, Hübn.—Most of the Japanese examples of this species are pale, and have ochreous-brown lines.

LITHOSIIDÆ.

NUDARIA MUNDANA, Linn.

SETINA IRRORELLA, Clerck.—Is replaced in Japan by *S. flava*, Brem. and Grey.

CALLIGENIA (= MILTOCHRISTA) MINIATA, Forst. = *rosaria*, Butl.).

LITHOSIA MUSCERDA, Hufn.

L GRISEOLA, Hübn. (= *adaucta*, Butl. = *ægrota*, Butl.).

L. DEPLANA, Esp. (= *pavescens*, Butl. = *lævis*, Butl.).

GNOPHRIA (= ŒONISTIS) QUADRA, Linn. (= *dives*, Butl.).

EUCHELIIDÆ.

DEIOPEIA PULCHELLA, Linn.—Does not appear to be common in Japan.

CHELONIIDÆ.

NEMEOPHILA PLANTAGINIS, Linn. (= *macromera*, Butl.).—A modification of the form *hospita* occurring in Japan has been named *leucomera* by Dr. Butler; whilst the European var. *matronalis* is represented by var. *melanomera*, Butl.

Arctia caia, Linn. (=*phæosoma*, Butl.).—Variable; but so far none of the more striking aberrations seen in British collections have been recorded from Japan.

Spilosoma fuliginosa, Linn.

S. menthastri, Fabr. (= *punctarium*, Cram.).—"Varies greatly in size and number of spots on the wings; also in colour of body, which ranges from pale yellow to vermilion. Further, the ground colour of primaries and thorax is buff instead of the normal white, agreeing in this respect with examples from the North of England."—(Leech.)

S. lubricipeda, Esp.—Is represented by *seriatopunctata*, Motsch.

Hepialidæ.

Hepialus hectus, Linn.

Cossidæ.

Cossus ligniperda, Fabr.—Is represented in Japan by *C. vicarius*, Walk.

Zeuzera pyrina, Linn. (= *æsculi*, Linn.).

Liparidæ.

Porthesia chrysorrhœa, Linn.

P. auriflua, Fabr.—The Japanese males are more spotted than British examples of the same sex.

Leucoma (= Stilpnotia) salicis, Linn.—Japanese specimens are rather more densely scaled than those from Europe.

Lœlia cœnosa, Hübn. (= *sangaica*, Moore).—Japanese specimens are rather darker coloured than European examples.

Ocneria (= Porthetria = Lymantria) dispar, Linn. (= *japonica*, Motsch.).—Mr. Leech says:—"Except that they are somewhat larger, male examples of *L. japonica*, Motsch., and *hadina*, Butl., are not separable from European males of *L. dispar* in my possession; whilst between *umbrosa*, Butl., and other males of *L. dispar* from Europe, also in my collection, there is not even a difference of size; consequently I cannot regard these insects as anything but forms of *L. dispar*." The specimens from Japan range in expanse from 37–71 millim., male; and from 48–114, female.

Psilura (= Lymantria) monacha, Linn.

Dasychira pudibunda, Linn. (= *pryeri*, Butl.).—Japanese examples are rather different to European specimens, and are referable to *pryeri*, Butl., with which *pudica*, Staud., appears to be identical.

Orgyia gonostigma, Fabr. (= *approximans*, Butl.).—Appears to be a local species in Japan.

BOMBYCIDÆ.

BOMBYX NEUSTRIA, Linn.—Variable as in England.

ODONESTIS POTATORIA, Linn.—This species occurs in the typical form in Japan, where there are also modifications leading up to the extreme form *albomaculata*, Brem.

LASIOCAMPA (= GASTROPACHA) QUERCIFOLIA, Linn. — The Japanese specimens most nearly approach the form *alnifolia*, Ochs.

L. ILICIFOLIA, Linn.—The Japanese form (var. *japonica*, Leech) is pale reddish-brown, with well-defined white markings, which are tinged with violet.

DICRANURIDÆ.

DICRANURA (= CERURA) FURCULA, Linn.

D. BIFIDA, Hübn.—Represented in Japan by *D.* (*C.*) *lanigera*, Butl.

D. VINULA, Linn. (=*felinia*, Butl.).

STAUROPUS FAGI, Linn. (= *persimilis*, Butl.).

NOTODONTIDÆ.

PTILOPHORA PLUMIGERA, Esp.

PTEROSTOMA PALPINA, Linn.—Japanese specimens are larger than British.

LOPHOPTERYX CAMELINA, Linn.

NOTODONTA BICOLOR, Schiff.

N. CHAONIA, Hübn.

N. TRIMACULA, Esp.

PYGÆRIDÆ.

CLOSTERA ANACHORETA, Fabr.

CYMATOPHORIDÆ.

GNOPHORA DERASA, Linn. (= *derasoides*, Butl.).

THYATIRA BATIS, Treit.

CYMATOPHORA DUPLARIS, Linn.

Note.—Heterogenea uncula, Staud., described from Amurland, is found in Japan; and *Pœcilocampa subpurpurea*, Butl., seems confined to Japan. There are seven species of Saturniidæ in the islands; but, with the exception of *Aglaia tau*, Linn., all are East Asian species. Of the genus *Phalera* Japan has four species, one of which, *P. fuscescens*, Butl., represents *P. bucephala*, L., but it has dark hind wings, and a larger apical spot or patch. There are six species of *Drepana;* but only one of these is European, i. e., *D. curvulata,* Bork., which does not occur in Britain.

Emydia, *Euchelia*, *Callimorpha*, *Trichiura*, *Eriogaster*, *Endromis*, *Saturnia*, *Cilix*, and *Glyphisia* seem to be unrepresented in Japan.

NOCTUÆ.

BRYOPHILIDÆ.

BRYOPHILA ALGÆ, Fabr.

BOMBYCOIDÆ.

MOMA (=DIPTHERA) ORION, Esp.

ACRONYCTA TRIDENS, Schiff. (= *increta*, Butl.). — Some Japanese specimens are 50 millim. in expanse.

A. PSI, Linn.

A. LEPORINA, Linn.

A. STRIGOSA, Fabr.

A. ALNI, Linn.

A. LIGUSTRI, Fabr.

A. RUMICIS, Linn.—Most of the Japanese specimens are dark coloured.

A. AURICOMA, Fabr.—Represented in Japan by *A. pruinosa*, Guen.

LEUCANIIDÆ.

LEUCANIA (MYTHIMNA) TURCA, Linn.

L. CONIGERA, Fabr.

L. UNIPUNCTA, Haw. (= *extranea*, Guen.).

L. IMPURA, Hübn.

NONAGRIA SPARGANII, Esp.

APAMEIDÆ.

GORTYNA (= OCHRIA) OCHRACEA, Hübn. (= *flavago*, Esp.).—Japanese specimens differ from British examples in having dark hind wings. Dr. Butler has named this form *Ochria fortis*.

HYDRŒCIA NICTITANS, Bork.—As variable in Japan as in Britain.

H. PETASITIS, Dbl. (? = *immanis*, Guen.).

AXYLIA PUTRIS, Linn.

XYLOPHASIA SCOLOPACINA, Esp.

DIPTERYGIA SCABRIUSCULA, Linn. (= *pinastri*, Linn.).—Japanese specimens are very dark.

CLOANTHA POLYODON, Clerck. (= *perspicillaris*, Linn. = *intermedia*, Brem.).

LAPHYGMA EXIGUA, Hübn.

MAMESTRA BRASSICÆ, Linn.

M. PERSICARIÆ, Linn.—The type and var. *unicolor*, Staud., are both found in Japan.

APAMEA BASILINEA, Fabr.

A. GEMINA, Hübn.

A. (HELOTROPHA) LEUCOSTIGMA, Hübn. (= *Cerastis lævis*, Butl.).

MIANA.—Eastern Asian species only, and two of these seem to be confined to Japan.

CARADRINIDÆ.

CARADRINA MORPHEUS, Hufn.

NOCTUIDÆ.

AGROTIS SUFFUSA, Hübn.

A. SEGETUM, Schiff. (= *ingrata*, Butl.).

A. OBSCURA, Brahm. (= *ravida*, Hübn. = *valida*, Walk. = *caliginea*, Butl.).—Rather more variable in Japan than in Europe.

A. (HAPALIA) PRÆCOX, Linn.

NOCTUA (OCHROPLEURA) PLECTA, Linn.

N. AUGUR, Fabr.

N. (GRAPHIPHORA) C-NIGRUM, Linn.

N. DITRAPEZIUM, Bork.

N. TRIANGULUM, Hufn.—Represented in Japan by a large form which Dr. Butler has named *plumbata*.

N. BRUNNEA, Fabr.

N. FESTIVA, Hübn.—Replaced in Japan by *N. descripta*, Brem.

N. DAHLII, Hübn. (= *canescens*, Butl.).—Rather more variable, both in size and colour, than in Europe.

N. BAIA, Fabr. (= *tabida*, Butl.).

AMPHIPYRIDÆ.

AMPHIPYRA PYRAMIDEA, Linn. (= *monolitha*, Guen. = *magna*, Walk.).—Japanese specimens vary in size and marking, but some are quite typical. The European species *A. perflua*, Fabr., and *A. livida*, Fabr., occur in Japan.

ORTHOSIIDÆ.

PANOLIS PINIPERDA, Panz.

TÆNIOCAMPA (SEMIOPHORA) GOTHICA, Linn.—Japanese specimens are not quite identical with typical *gothica*, and a modification of the *gothicina* form occurs.

T. INCERTA, Hufn. (= *instabilis*, Esp. = *evanida*, Butl.).—The Japanese specimens are generally larger than British examples.

T. STABILIS, View.

T. GRACILIS, Fabr. (= *ella*, Butl.).—Pale and dark forms occur in Japan.

T. MUNDA, Esp.—Japanese specimens are usually larger than European examples. The var. *immaculata*, Staud., is also represented.

ORTHOSIA SUSPECTA, Hübn.

CERASTIS VACCINII, Linn. (=*Dasycampa ardescens*, Butl.).—The form named by Dr. Butler is of the typical character, but it is larger in size, as also are specimens agreeing in marking with var. *mixta*, Staud.

DASYCAMPA RUBIGINEA, Fabr. (=*fornax*, Butl.).—Typical examples occur in Japan, as well as a large form which Dr. Butler has named *fornax*.

OPORINA CROCEAGO, Fabr. (= *sericea*, Butl.).

XANTHIA FULVAGO, Linn. (= *cerago*, Fabr.).

X. FLAVAGO, Fabr. (= *silago*, Hübn.).

COSMIIDÆ.

TETHEA (IPIMORPHA) RETUSA, Linn. (= *Cosmia curvata*, Butl.).

CALYMNIA TRAPEZINA, Linn. (= *Mesogona exigua*, Butl.).

C. PYRALINA, View.

C. AFFINIS, Linn.

HADENIDÆ.

DIANTHŒCIA COMPTA, Treit.

D. CUCUBALI, Fuessl.

MISELIA OXYACANTHÆ, Linn.—Represented in Japan by *M. extensa*, Butl., which has very elongate wings, but is otherwise similar to *M. oxyacanthæ*.

AGRIOPIS APRILINA, Linn.—Represented by *A. viridis*, Leech.

EUPLEXIA LUCIPARA, Linn.

PHLOGOPHORA METICULOSA, Linn.—Replaced in Japan by *P. beatrix*, Butl.

APLECTA (EUROIS) PRASINA, Fabr. (= *herbida*, Hübn.).

A. (E.) OCCULTA, Linn.

A. (E.) NEBULOSA, Hufn.

A. (MAMESTRA) ADVENA, Fabr.—Represented in Japan by the form *adjuncta*, Staud.

HADENA PORPHYREA, Esp. (= *satura*, Hübn.).

H. (DICHONIA) PROTEA, Bork. (= *intermissa*, Butl.).—Typical specimens, as well as var. *intermissa*, occur in Japan.

H. (TRACHEA) ATRIPLICIS, Linn. (= *gnoma*, Butl.).

XYLINIDÆ.

CALOCAMPA EXOLETA, Linn. (=*fumosa*, Butl.).

XYLINA ORNITHOPUS, Rott. (= *rhizolitha*, Fabr. = *pruinosa*, Butl.).

X. FURCIFERA, Hufn. (= *conformis*, Fabr.).—Replaced by *X. "Agrotis" ustulata*, Butl.

CUCULLIA ASTERIS, Schiff.

GONOPTERIDÆ.

GONOPTERA LIBATRIX, Linn.

PLUSIIDÆ.

HABROSTOLA TRIPLASIA, Linn.

PLUSIA CHRYSON, Esp. (= *orichalcea*, Hübn.).

P. CHRYSITIS, Linn. (= *nadeja*, Oberth.).—The form of this species characterised by a broken dark band on the fore wing has been named *nadeja* by M. Oberthür. It is the dominal form in Japan.

P. BRACTEA, Fabr.—Represented in Japan by *P. excelsa*, Kretsch. (= *metabractea*, Butl.).

P. FESTUCÆ, Linn.—Japanese specimens are rather small.

P. GAMMA, Linn.—Replaced in Japan by the closely allied Indian species *P. nigrisigna*, Walk.

P. NI, Hübn.—This species occurs in Japan, but seems to be rare.

HELIOTHIDÆ.

HELIOTHIS ARMIGERA, Hübn.

H. DIPSACEUS, Linn. (= *adaucta*, Butl.).

CHARICLEA UMBRA, Hufn. (= *marginata*, Fabr.).

ACONTIIDÆ.

AGROPHILA TRABEALIS, Scop. (= *sulphuralis*, Linn.).—Varies in Japan.

ACONTIA.—All Eastern Asian species.

ERASTRIIDÆ.

ERASTRIA FASCIANA, Linn. (= *stygia*, Butl.).—A variable species in Japan.

HYDRELIA UNCULA, Clerck.

POAPHILIDÆ.

PHYTOMETRA VIRIDARIA, Clerck. (= *ænea*, Hübn.).

EUCLIDIIDÆ.

EUCLIDIA GLYPHICA, Linn. (= *consors*, Butl.).

CATOCALIDÆ.

CATOCALA NUPTA, Linn.

C. ELECTA, Bork. (= *zalmunna*, Butl.).

Toxocampidæ.

Toxocampa.—All Eastern Asian species, with the exception of *T. limosa*, Treit., which is European, but does not occur in Britain.

Herminiidæ.

Rivula sericealis, Scop.
Zanclognatha grisealis, Hübn.
Z. tarsipennalis, Treit.
Herminia derivalis, Hübn.
Pechypogon barbalis, Clerck.

Hypenidæ.

Madopa salicalis, Schiff. (= *Amblygoes cinerea*, Butl.).
Bomolocha fontis, Thnb. (= *crassalis*, Fabr. = *gilla*, Butl.).
Hypena rostralis, Linn.

GEOMETRÆ.

See list in 'Entomologist,' xxx. pp. 244–247, 312–316, and xxxi. pp. 4–9.

The British species of Rhopalocera occurring in Japan are referred to in a paper entitled "On the Distribution in Eastern Asia of certain Species of Lepidoptera occurring in Britain" (Entom. xxiv. pp. 81–86).

THE NORTH AMERICAN BEES of the GENUS *PROSAPIS*.

By T. D. A. Cockerell, N. M. Agr. Exp. Sta.

(Concluded from p. 219.)

The following table was prepared to separate the principal forms studied, but it is not suggested that the distinctions are all specific :—

Females.

1.	Face all dark, tubercles all dark, size large . .	*basalis.*
2.	Face not all dark	3.
3.	Base of abdomen rufous	4.
	Base of abdomen concolorous with the rest . .	5.
4.	Legs fulvous	*flammipes.*
	Legs black, tibiæ partly yellow, hind tarsi fulvous	*nelumbonis.*
5.	First abdominal segment distinctly punctured .	6.
	First abdominal segment not distinctly or not at all punctured	8.

6. Scutellum, and a broad band down middle of clypeus, yellow . . . . . *mexicana, vigilans, trepanda.*
Scutellum not at all yellow . . . . . . 7.
7. Lateral face-marks shaped like feet on tiptoe . *asinina.*
Lateral face-marks very narrow, not like feet Sp. from Tuerto Mt., N. M.
Lateral face-marks triangular . . . Sp. from Texas.
8. Small species, with the punctuation of the pleura sparse and shallow . . . . . . 8*a*.
Mostly larger species, face-marks triangular or bow-shaped, pleura coarsely punctured . . . . 9.
8*a*. Clypeus with a light spot, face-marks subtriangular, tegulæ with a yellow spot . . . . . *mesillæ.*
Clypeus all dark, face-marks bow-shaped, tegulæ all dark, collar dark . . . . *pygmæa*, S. Dakota.
Clypeus all dark, face-marks narrowly triangular, tegulæ with a yellow spot, collar dark *pygmæa*, var., Colorado.
(There may be a little spot on clypeus of *pygmæa.*)
9. Lateral face-marks triangular . . . . . 10.
Lateral face-marks elongate or bow-shaped . . 12.
10. Lateral face-marks curved inward at the apex, tegulæ all dark (rarely with a spot) . . . *modesta.*
Similar, but much more sparsely punctured . . *sparsa.*
Similar, but thorax much more coarsely punctured, wings darkened . . . . *confluens.*
Lateral face-marks terminating in a point on orbital margin . . . . 11.
11. Somewhat larger, tegulæ without a yellow spot . 11*a*.
Somewhat smaller, tegulæ with a yellow spot . 11*b*.
11*a*. Face-marks pure white . . . . . Sp. from Texas.
Face-marks deep yellow . . . . . . 11*c*.
11*c*. Wings hyaline, 2nd submarginal cell longer *wootoni* (presumably).
Wings subfuliginous, 2nd submarginal cell shorter. (The 2nd submarginal varies, however; the tegulæ may have a small yellow spot) . Sp. from Georgia.
11*b*. Clypeus all dark . . . . *ziziæ.*
Clypeus with a very broad pale band, or conical mark . . . . 11*d*.
11*d*. Thorax closely and finely punctured, scutellum closely punctured, wings pale fuliginous, band on clypeus . . . . . Sp. from California (*bakeri ?*).
Thorax coarsely and deeply punctured, scutellum sparsely punctured, wings hyaline, conical mark on clypeus . . . . *azteca.*
12. Wings fuliginous, no spot on tegulæ . . . *schwarzii.*
Wings hyaline, no spot on tegulæ (rarely a small spot) 12*a*,
Similar, but much smaller . . . Sp. from Georgia.
Wings hyaline, a spot on tegulæ . . . . 12*b*.
Similar, wings fusco-hyaline, markings cream-colour *limbifrons.* (Cuba.)

12*a*.	Collar all dark	12*c*.
	Collar partly light	Sp. from Colo. (and apparently the same from N. H. and Md.)
12*c*.	Basal one-third of hind tibiæ light	Sp. from N. H.
	Basal one-fourth of hind tibiæ light	Sp. from Calif. and Vanc. I.
12*b*.	Collar all dark (excl. tubercles)	12*d*.
	Collar partly light	12*e*.
12*d*.	Markings yellow, clypeus all dark	*varifrons*.
	Markings whitish, clypeus with a transverse white band	Sp. from Colorado.
12*e*.	Head longer, markings whitish	Sp. from Colorado.
	Head shorter, markings yellow	Sp. from N. H.
	Head shorter, markings whitish, lower half of clypeus rufescent	Sp. from Nevada.
	Light band on lower edge of clypeus	*elliptica*. (Canada.)

It may be useful, in conclusion, to give a list of the species known from America north of the Isthmus of Panama. Full bibliographical references will be found to those of Smith and Cresson in Dalla Torre's recent catalogue of bees; for the species of Robertson and the present writer see the most recent volumes of 'Psyche,' Trans. Am. Ent. Soc., and Canad. Entom.

(1.) Boreal species, extending more or less across the northern part of the continent:—

P. basalis, Sm., 1853.
P. varifrons, Cr., 1869.
P. pygmæa, Cr., 1869.
P. elliptica, Kirby, 1837.

(2.) Species of the N.E. States, and Canada, W. to the plains:—

P. modesta, Say, 1837.
P. ziziæ, Rob., 1896.
  ? = *affinis*, Smith, 1853.
P. pennsylvanica, Ckll., 1896. (Pa., Va.)
P. antennata, Cress., 1869. (N. J., Md.)
P. saniculæ, Rob., 1896. (Ill., Ia.)
P. nelumbonis, Rob., 1890. (Ill.)
P. illinoensis, Rob., 1896. (Ill.)
P. sparsa, Cress., 1869. (Pa.)
P. verticalis, Cress., 1869. (Mass., Pa., Conn.)

(3.) Species of the Atlantic seaboard, Fla. to N. J.:—

P. confluens, Sm., 1853.

(4.) Species of the Southern States, W. to the plains:—

P. schwarzii, Ckll., 1896. (Fla.)
P. flammipes, Rob., 1893. (Fla.)
P. floridana, Rob., 1893.
P. georgica, Ckll., 1896. (Ga.)
P. triangularis, Ckll., 1896. (Ga.)
P. labiatifrons, Ckll., 1896. (Ga.)

(5.) Species of S. Dakota, approaching the Rocky Mts. types:—

P. ziziæ, race *dunningi*, Ckll., nov.

(6.) Species found west of the plains:—

P. mesillæ, Ckll., 1896.
  syn. *subtilis*, Fox MS., Ckll. (preocc.)
P. bakeri, Ckll., 1896.
P. citrinifrons, Ckll., 1896.
P. rugosula, Ckll., 1896. (Colo.

P. asinina, Ckll. and Casad., 1895. (N. M.)
syn. (♀) *bipes*, Ckll. and Casad.
P. rudbeckiæ, Ckll. and Casad., 1895.
race *ruidosensis*, Ckll., 1896.
race *subdigitata*, Ckll., 1896.
P. digitata, Ckll., 1896. (Colo.)
P. wootoni, Ckll., 1896. (N. M.)
P. tridentula, Ckll., 1896.
var. *fallax*, Ckll., 1896.
P. tridens, Ckll., 1896. (Colo.)
P. divergens, Ckll., 1896.
P. episcopalis, Ckll., 1896. (Colo.)
P. coloradensis, Ckll., 1896. (Colo.)
P. suffusa, Ckll., 1896. (Nev.)
P. nevadensis, Ckll., 1896. (Nev.)
P. coquillettii, Ckll., 1896. (Calif.)

(7.) Species of Mexico and Central America :—

P. azteca, Cr., 1869.
P. dubiosa, Cr., 1869.
P. mexicana, Cr., 1869.
P. grossa, Cr., 1869.
P. maculipennis, Sm., 1879.
P. trepanda, Sm., 1879.
P. vigilans, Sm., 1879.

(8.) Species of Cuba :—

P. limbifrons, Cr., 1869.

Mesilla Park, New Mexico, U.S.A.

THE COCCIDÆ OF THE SANDWICH ISLANDS.

By T. D. A. Cockerell, N. M. Agr. Exp. Sta.

In the following publications the known Sandwich Island Coccidæ will be found recorded :—

(1). W. M. Maskell, Trans. New Zealand Institute, vol. xxvii.
(2). ,, ,, ,, ,, vol. xxix.
(3). ,, Ent. Mo. Mag., Oct., 1897, p. 240.
(4). Alex. Craw, 5th Biennial Rept. State Bd. Horticulture (California), 1896.
(5). Alex. Craw, Bull. 4, Tech. Ser., Div. Ent., U.S. Dept. Agriculture, 1896, p. 40.
(6). Cockerell, Bull. 6, Tech. Ser., Div. Ent., U.S. Dept. Agriculture, 1897, p. 22.
(7). Cockerell, Proc. U.S. Natl. Museum, vol. xvii. p. 621 (compilation of the early records).
(8). Howard and Marlatt, Bull. 3, N. S., Div. Ent., U.S. Dept. Agriculture, 1896, p. 11.

In the following list of the species the numbers following the names indicate the place of publication, agreeing with the numbers of the above list of papers. Species marked * have as yet only been found in the Sandwich Islands :—

Icerya purchasi, Mask. (1)
**Sphærococcus bambusæ*, Mask. (7)
Asterolecanium pustulans, Ckll. (7)
Dactylopius citri, Risso. (7)
D. albizziæ, Mask. (5)
A. cydoniæ, Comst. (3) (with a v. *tecta*, Mask.)
A. maskelli, Ckll. (6)
**A. persearum*, n. sp.
A. perniciosus, Comst. (8)

**D. vastator*, Mask. (1)
D. virgatus, Ckll. (2) (syn. *ceriferus*, Newst.)
Ceroplastes rubens, Mask. (4)
Lecanium nigrum, Nietn. (4)
L. nigrum v. *depressum*, Targ. (7)
L. hesperidum, L. (7)
L. oleæ, Bern. (7)
L. acuminatum, Sign. (7)
L. longulum, Dougl. (1)
**Pulvinaria mammeæ*, Mask. (1)
P. psidii, Mask. (7)
Aspidistus aurantii, Mask. (1)
A. longispina, Morg. (1)
A. hederæ, Vall. v. *nerii*, Bouché (1)
Mytilaspis gloverii, Pack. (4)
**M. hawaiiensis*, Mask. (1) (as var. of *flava*)
M. pomorum, Bouché (1)
M. pallida, Green, v. *maskelli*, Ckll. (1)
Howardia biclavis, Comst. v. *detecta*, Mask. (1)
Chionaspis prunicola, Mask. (1) (syn. of *Diaspis amygdali*, Tryon, *fide* Cooley, *in litt.*)
C. eugeniæ, Mask. (2)
Fiorinia fioriniæ, Targ. (4)
Aulacaspis boisduvalii, Sign. (1)
A. rosæ, Bouché (1)

The noticeable thing about this list is that nearly all the species are importations from elsewhere. The *Aspidistus maskelli*, lately described from the Sandwich Islands, has just been found by Dr. Noack in plenty at Campinas, Brazil. So it may soon be with most of the remaining five possibly endemic species, that they will be found to occur elsewhere; in fact, it is not certain that we really know anything about the *native* Coccidæ of the Sandwich Islands, or, indeed, whether there are any!

The description of a new species follows:—

Aspidistus persearum, n. sp.

♀. Scale suboval, 1¼ mm. long, 1 broad; slightly convex, brownish cream-colour; exuviæ sublateral, concolorous, inconspicuous. The scale is easily distinguished from that of *A. destructor*, being quite opaque, dull, more coloured, and not so flat.

♀. Of ordinary form, pale lemon yellow. Four groups of circumgenital glands, of six orifices each. Three pairs of lobes, the median ones brown, the others colourless; median lobes close together but not quite touching, parallel, elongate, considerably longer than broad, the sides straight, the rounded ends minutely serrate; second lobes similar in shape but smaller, also serrate at ends, *their ends reaching slightly beyond the level of the tips of the median lobes*; third lobes small, notched on the outer side. Squames branched and serrate, as in allied forms; there are seven beyond the third lobe, Spines large, but not longer than the squames. Anal orifice small. close to the base of the median lobes.

Hab. Scales gregarious on under side of leaf of avocado pear (*Persea persea* = *P. gratissima*) from Honolulu, 1898. Found by Mr. Alex. Craw in the course of his horticultural quarantine work at San Francisco. The portion of the leaf attacked turns brown beneath, reddish above. *A. persearum* is a species of *Aspidistus*, s. str., allied to *A. destructor*, Sign. It is in no way related to *A. perseæ*, Comst.

Mesilla Park, New Mexico, U.S.A.: August 6th, 1898.

NOTES AND OBSERVATIONS.

Eremobia ochroleuca at Sugar.—As I do not think this species usually turns up at sugar, it may be worth while recording that I took a specimen here on a sugared elm trunk on Aug. 25th last. Although I distinctly saw it sipping the sugar, it was apparently not quite at its ease, as no sooner did I turn my lantern on it that it fell down among the grass beneath. I succeeded, however, in boxing it, and found it to be in very good condition. I have taken this species for nearly thirty years, but never previously at sugar. My friend Mr. E. A. Fitch informs me that he has taken it at sugar also this year, two specimens. It is a much rarer species in this neighbourhood than it was some few years ago.—(Rev.) Gilbert H. Raynor; Hazeleigh Rectory, Maldon, Essex, August 30th, 1898.

The Larva of Ctenucha venosa.—On the Experimental Station Farm, Mesilla Park, New Mexico, July 26th, I found a couple of larvæ feeding on the grass. In general appearance they reminded me of those of *Hyphantria*. They were about 19 mm. long, pale ochrey yellow, with moderately long barbed white hairs springing in bundles from colourless tubercles. Subdorsal and lateral pale lemon yellow stripes, narrowly and irregularly edged with pink. Head sordid yellow, shiny. Stigmata brown. Thoracic legs bright yellowish brown. One pupated in some corner of the breeding cage, the other spun a thin cocoon on the inflorescence of the grass. The moths emerged Aug. 5th and 6th, and proved to be *Ctenucha* (*Philaros*) *venosa* (Walk.), which ranges from New Mexico and Texas to Venezuela, according to Neumoegen and Dyar. The species was first identified for me by Dr. Dyar, from specimens found in Fillmore Cañon, Organ Mountains, N.M. The larva has not been described, so far as I can learn.—T. D. A. Cockerell, Aug. 6th, 1898.

Protective Resemblance.—All those collectors of Lepidoptera who have been able to work much in the field cannot fail to have noticed the beautiful and remarkable protective resemblance which some species bear to their surroundings; and there can be no doubt that they possess an inherited and instinctive knowledge of this assimilation, and select such places as a protection against their *natural* enemies. Man is an *unnatural* and unknown enemy, but even he, unless a keen and practised observer, will fail to notice them even when within a few feet of him, so beautiful is often the protective resemblance. What wonderful instances of this are *Cucullia umbratica* when resting on posts or palings; *Polia chi* on rocks, appearing like a spot of grey lichen; *Acronycta psi* on the trunk of oak or ash; and many others that will be remembered. The following three apparently special instances of this protective resemblance, which have come under my notice during the last few seasons, may be worthy of record. On one occasion when passing across some hill land in Wales, where gorse occurred here and there, some of which had been scorched by burning, and only the stems with some of the foliage singed remained, having in parts a reddish brown appearance,—here I found a specimen, with wings closed, of *Arctia* *fuliginosa;* the protective resemblance was remarkable, and quite a chance of one not passing it. Another instance was that of *Gonoptera libatrix* resting on the ground amongst leaves, with the under side uppermost, the beautiful white tips of its feet appearing like a white fungoid growth, as they lightly clasped the leaves. Another instance, which perhaps may be thought doubtful, but which I feel myself almost certain of, is that of the larva of *Chœrocampa porcellus.* In a glade of a Gloucestershire wood I found on the sides large patches of lady's bedstraw (*Galium*). In one spot a species of vetch was intermingled, the dark seed-pods scattered here and there; noticing from a short way off something rather peculiar, as I thought, in two of them, I found on approaching two larvæ of *C. porcellus* of medium size. The resemblance of the larva, when stretched out, to the seed-pods was quite remarkable, and doubtless might have deceived many a bird. Would it be too much to imagine that the parent moth selected such a spot for the ova foreseeing the chance of protection as above described? For some reason many species do not deposit their ova on the proper food indiscriminately, but frequently appear to select those plants less likely perhaps to be visited by birds.—T. B. Jefferys; Bath.

CAPTURES AND FIELD REPORTS.

Colias edusa at Swanage.—*Colias edusa* has been not uncommon at Swanage this year. Three or four were seen on Aug. 20th, and three caught, and another seen on Sept. 2nd. — E. N. Hall; 4, The Avenue, Brondesbury.

Colias edusa at Chichester.—*Colias edusa* appeared very sparingly this year in this neighbourhood. The first seen was on Aug. 16th, a male of extraordinarily large size. A noticeable feature of the season has been the remarkable profusion of *Pieris brassicæ;* they rose from and flew over the clover fields in all directions, filling the air, their white wings resembling a snowstorm. The gardens have suffered severely in consequence from the depredations of the larvæ, our own not excepted. I have heard of a market-gardener who lost as many as seven thousand plants of broccoli and other kinds of cabbage.—Joseph Anderson; Chichester.

Colias edusa in Cornwall.—On Sept. 1st I noticed a male specimen of *C. edusa* on the hills overlooking Fowey Harbour near here, and two more on the 13th inst.—Arthur Rashleigh; Menabilly, Par Station, Cornwall, Sept. 13th, 1898.

Colias edusa in Epping Forest.—Whilst walking through some fields near Chingford on August 28th, I observed a fine female specimen of this species.—E. C. Joy; 34, Fairholt Road, Stoke Newington, N.

Colias edusa in Oxfordshire.—On Sept. 3rd a fine male flew past me at a level crossing on the London and North Western Railway between Bicester and Islip. This is the first I have noted in this district since 1892, when the species was fairly common. — G. C. Hughes; Chesterton, Bicester, Sept. 16th, 1898.

ACHERONTIA ATROPOS AT CHICHESTER. — I have heard of only one example of this moth, in either stage, in this district during the present season. This was a pupa turned up by our gardener on Aug. 24th whilst digging potatoes. Unfortunately he stuck his prong through the middle of it.—JOSEPH ANDERSON ; Chichester.

SPHINX CONVOLVULI AT SIDMOUTH. — On Sept. 3rd and 4th I took *Sphinx convolvuli* flying over the tobacco-plants in a garden at Sidmouth, both being perfect specimens. — H. O. WELLS ; Hurstfield, The Avenue, Gipsy Hill, London, S.E., Sept. 9th, 1898.

VANESSA ANTIOPA IN KENT.—A fine specimen of *V. antiopa* was captured at East Farleigh, Maidstone, by Mr. Keith Kenward, on Aug. 18th last.—EDWARD GOODWIN ; Canon Court, Wateringbury, Kent, Sept. 3rd.

VANESSA ATALANTA ON THE WING AT NIGHT.—A specimen of *Vanessa atalanta* flew into my window after dark on Sept. 17th. It did not seem willing to fly into the darkness of night again, though I tried to make it go. It constantly returned, settling on me or in the room. I do not understand its being abroad at that time of the night.—E. N. HALL ; 4, The Avenue, Brondesbury.

NOTODONTA DICTÆOIDES AT CHICHESTER.—A specimen of this moth, in good condition, was found by my brother, Mr. Frederick Anderson, settled on a wall in the garden, on Aug. 17th.—JOSEPH ANDERSON ; Chichester.

PHIBALAPTERYX LAPIDATA.—On Sept. 4th last I took a specimen of *P. lapidata* at Badenloch, in Sutherlandshire. It was flying in the hot sunshine.—W. M. CHRISTY ; Watergate, Emsworth, Hants.

LARVÆ ON IMPATIENS.—From Sept. 5th to present date (Sept. 14th), I have made careful search over many patches of the wild balsam (*Impatiens noli-me-tangere*) growing near Windermere Lake, but have failed to discover the least trace of *Cidaria reticulata*. The commonest larva lately has been *Euplexia lucipara*, both on balsam and on any species of fern. I found the species equally abundant on Sept. 3rd, in a greenhouse at Morecambe. On Sept. 9th, while examining a patch of *Impatiens* at Lake Side, my attention was drawn to the pallid appearance of one plant, and then to a large piece of frass on a leaf. My thoughts, regardless of date, instinctively flew to *Sphinx convolvuli;* but no: it was a full-fed larva of *Chærocampa elpenor* clinging to the stem. I have thought this may be worth note, as *C. elpenor* is not common in the district; it was also very late for the larval stage; and, thirdly, it has not before, I believe, been recorded to feed on *Impatiens noli-me-tangere.*—(Rev.) A. M. MOSS ; Kendal.

COLLECTING AT FOLKESTONE.—While staying at Folkestone for a fortnight in July, I managed to take a few very good insects, including *Sesia chrysidiformis* (one only), *S. ichneumoniformis, Tapinostola bondii, Setina irrorella, Bryophila glandifera, Acidalia ornata,* a few nice vars. of *B. perla, Odontia dentalis* (two); I also found one larva and one pupa of the latter, both of which have since attained the perfect state. Mr. Purdey informed me that this species used to occur in fair numbers, but he had not taken it for years. I also saw one worn *Vanessa cardui.* — W. E. BUTLER ; Hayling House, Reading, Sept. 5th, 1898.

COLLECTING IN SOUTH DEVON.—During the first fortnight of September I was staying in South Devonshire, and did some sugaring on the 9th and

10th of that month. Both nights were very favourable, and the insects were without exception in perfect condition, amongst them being a beautiful and evidently freshly emerged specimen of *Laphygma exigua*. I also took *Stilbia anomala* in fair numbers, and odd examples of *Agrotis suffusa*, *A. saucia*, and *Noctua glareosa*. *A. vestigialis*=*valligera* and *Leucania littoralis* were in abundance, and some beautiful varieties of *A. segetum* were taken.—H. W. SHEPHEARD-WALWYN; West Downs, Winchester.

COLLECTING IN SOUTH WALES.—Six miles west of Pembroke is a little village called Castlemartin. A former vicar, the Rev. Clennell Wilkinson, loved insects, and told us something of those in his district; and as the present vicar, the Rev. J. S. Puckridge, is an entomologist too, we may hope to learn more. But as at present the extreme western points of South Wales have hardly been exhaustively worked, a few notes of captures at Castlemartin during my stay there in August may not be unwelcome. The nettles were in danger of disappearing altogether from the ravages of *V. atalanta* and *V. urticæ;* the latter were in scores of thousands, but a most careful search failed to produce *V. io*. *V. cardui* were also difficult to find, though on a former visit we secured large numbers. *Bombyx rubi* loved the churchyard, where forty-five were taken in half an hour feeding on the bird's-foot trefoil; as this plant is not obtainable in London during the winter, and they would eat nothing else, they had to be returned. I met a friend who had been successful in breeding over forty imagines from larvæ taken in this district. *Odonestis potatoria* (very small) were abundant. The seed-pods of the campion were being robbed to an extent which seriously threatens the future of that bright little flower; almost every other head was tenanted by a *Dianthœcia* larva. It is not easy to define the species in this stage, but there were certainly more than one. *Eupithecia* larvæ were scarce in the campion-heads. The wormwood (*Artemisia absinthium*) was unusually plentiful, and we were told that *Cucullia absinthii* is often found; but, though I set many young eyes to search, we did not see one. *Dicranura vinula* and *Sphinx ligustri* were plentiful. *D. furcula* was beaten from sallow, with very many interesting geometers, most of which are now pupæ. Our great prize was a magnificent *Acherontia atropos*, just about to become a pupa; but, alas! a merry little kitten found him out, and, being over exuberant in her play, killed him. Of butterflies, there is little to record. *Argynnis paphia* and *A. aglaia* were taken, but not in good condition. *Chrysophanus phlœas* were large and very dark, and *Lycæna astrarche* unusually fine and abundant. I was told *L. ægon* had been plentiful, but I did not see it: neither could *Colias edusa* be found, though ideal cliffs and clover fields abounded. No part of our collecting was more pleasant or successful than "dusking"—to use a quite outrageous word. Geometers abounded; one small corner yielded a very fine and varied series of *Epione apiciaria*. Of the genus *Acidalia*, *imitaria*, *aversata*, *scutulata*, and *bisetata* were common. Of the *Eupithecia*, the best were *minutata* and *coronata;* four of the latter were taken on the wing and one at sugar. *E. decolorata* was very common, and strongly marked; *Emmelesia affinitata* was nearly over. Among the *Cidaria* were *prunata*=*ribesiaria*, *silaceata*, *testata*, *pyraliata*, the last not common. *Hypsipetes elutata* were strikingly varied; the series taken includes specimens from the lightest green to dark brown, two or three having no markings whatever. Of the thorns, only *Selenia bilunaria* and *Crocallis elinguaria* were taken, and the emeralds were represented by *Pseudoterpna pruinata*=*cytisaria* and *Hemithea strigata*=

thymiaria (?). Among the geometers were also *Melanthia bicolorata*=*rubiginata*, *Eubolia limitata*=*mensuraria*, *E. plumbaria*, *Cabera pusaria*, *C. exanthemaria*, *Lomaspilis marginata*, *Aspilates ochrearia* = *citraria*, *Coremia designata* = *propugnata*, *C. unidentata*, *Larentia didymata*, and many others still more common. The only cuspid found was *Cilix glaucata* =*spinula*, which was fairly plentiful, though I found the larvæ of three others. *Lithosia complanula* was abundant and in perfect condition; *Hepialis humuli* was represented only by females; *H. lupulinus* were generally too damaged to be worth taking. Masses of ragwort grew close down by the sea, and on the flowers *Agrotis vestigialis* = *valligera* was abundant by day. By night the same flowers attracted *A. tritici*, but in one field only. In others *Apamea didyma*=*oculea* abounded in many forms; these are so perplexing that one is not surprised at the five species and thirteen varieties of the great Haworth. Among other common Noctuæ that fell to the net were *Leucania conigera*, *L. lithargyria*, *Caradrina quadripunctata* = *cubicularis*, *Miana fasciuncula*, *M. furuncula*, *Hadena oleracea*, *Hydrœcia nictitans*, *Dianthœcia capsincola*, *Xylophasia rurea*, *Tapinostola fulva*, *Noctua umbrosa*. Sugaring was difficult, as there are very few trees; but my wife and I were out most nights, only to be confirmed in our belief that, however perfect our methods may be, the science of sugaring is all but unknown. The average captures were from two to eight or ten specimens a night, generally of the commonest species. But suddenly, on our last night but one, moths swarmed; we might have taken hundreds, including two or three species not seen before. As far as one could tell, the climatic conditions and all others were the same as on many other nights. What wrought so strongly among the moths on this one night? Sugaring is pleasant enough, even when "takes" are few; there are the visits of newts and frogs, and bats and owls, and many less known creatures from all orders of living things, and the chance of seeing how they plan and work and fight for their living; but it would be useful sometimes to know with fair accuracy the nights when captures may and may not be expected. The information at present published is not reliable. I do not know whether anything more reliable is possible, but will not some of the scientific minds among our brotherhood try to give us at least as much help as we have in fixing upon "likely days" for trout? Our sugaring yielded nothing more worthy of mention than *N. dahlii*, *C. blanda*, *L. impura*, and *N. plecta*. — E. Grose Hodge; Holy Trinity Rectory, Marylebone, Sept. 12th, 1898.

Collecting in South Devon.—A fortnight's collecting at Sidmouth in July, with Mr. S. P. Doudney, was very successful, as the weather was perfect, and all the butterflies were in splendid condition. On the cliffs *Hesperia actæon* swarmed at its usual haunts, and *Melanargia galatea* occurred elsewhere; but *Leucophasia sinapis* and *Argynnis aglaia* were scarcer than usual. In Harpford Woods *Argynnis paphia* and *A. adippe* were abundant, and *Thecla quercus* could be taken in the lanes. The following moths were taken:—*Sphinx ligustri*, *Leucania lithargyria*, *L. impura*, *L. pallens*, *Heliothis marginatus*, *Geometra papilionaria*, *Metrocampa margaritaria*, *Eubolia palumbaria*, *E. bipunctaria*, and *Cidaria fulvata*. Sugaring only produced *Heliothis marginatus* (one), *Thyatira derasa* (one), *Leucania lithargyria* (one), *Miana furuncula* (five), *Xylophasia monoglypha* (one), *Apamea oculea* (two), and *Eubolia bipunctaria* (one). Larvæ were scarce, except *Macroglossa stellatarum* and *Melanthia galiata*, which were very common on the *Galium mollugo* and *verum*; and *Vanessa io* swarmed on the nettles.—H. O. Wells; Hurstfield, The Avenue, Gipsy Hill, London, S.E., Sept. 19th, 1898.

Notes of the Season in Essex.—The season here, on the western border of the county, has been specially marked by two features, the failure of sugar and the attractiveness of light; while to myself it was noteworthy for the number of species taken which I had not seen here before. Between April and September I obtained as many as fifty species which I did not previously know to occur. It is also probable that in the brief notes of captures which follow some peculiar dates may be observed. Roughly speaking, from the beginning of the year up to June 17th arctic weather and north-east gales prevailed, a state of things which made any attempt at collecting a mere farce. Not a moth of any kind, except a single *Herminia tarsipennalis*, came to sugar until Aug. 8th, when there was one moth; on the 10th there were five, on the 16th about a dozen, and after that date they were abundant. I may note here, as of a piece with the other eccentricities of the season, that the two best nights at sugar in point of numbers were marked by a cold east wind and bright moon. In March *Anticlea badiata*, and in May *A. derivata* were fairly plentiful, but there being no sallows here to speak of, I saw nothing else. On May 26th there was a specimen of *Eupithecia coronata* sitting on a tree, and later on some of the second brood appeared. Nothing else worth noting happened till the second and third weeks of June, when there appeared all together *Cidaria corylata* and *C. russata*, *Emmelesia affinitata* and *E. decolorata*, *Ephyra omicronaria*, *Eupisteria heparata*, and *Asthena candidata*, with a single specimen of *Neuria saponariæ*. Really warm weather set in on June 27th, when two or three *Anticlea rubidata* were taken; *Bradyepetes* (*Timandra*) *amataria* was excessively abundant in ditches, accompanied by *Melanippe rivata* and *M. unangulata*, both rather scarce, while higher up the hedge *Asthena luteata* was skipping madly along, and *Ligdia adustata* was plentiful. On July 7th *Scotosia vetulata* began to be in great profusion about one spot in a hedge where I could see no buckthorn anywhere near. It was an ordinary whitethorn hedge with sallow bushes and oak trees overhanging. The *vetulata* seemed to devote themselves entirely to the whitethorn. Nearly a month later a single *S. rhamnata* flew out of a holly hedge in my garden, where I know there is no buckthorn within half a mile. It was in fine condition too. The lovely little *Pyralis costalis* appeared on July 8th, and, together with *P. glaucinalis*, must have had a succession of broods, since fine specimens of both continued to turn up at sugar and light until September. On July 18th *Acidalia imitaria* began to appear, and was very common, and so was *Ebulea crocealis* round the fleabane. *Pyrausta purpuralis* came freely to light, but I could never see it in the daytime. *Endotricha flammealis* came to light on July 27th, and *Eupithecia centaureata* began to come very freely to light on Aug. 13th. A fine specimen of *Pterostoma palpina* turned up in the trap on Aug. 16th, I having previously secured one at Wicken on June 22nd. With the attractions of sugar beginning to be felt, I now was able to do something with Noctuæ. *Noctua xanthographa*, of the form *cohæsa*, which is almost the only form of it we get here, was first visible on Aug. 17th, *Catocala nupta* on the 18th, a second brood (I suppose) of *Ligdia adustata* the same evening, *Cosmia diffinis*, *Luperina cespitis*, *Paraponyx stratiotata*, *Ennomos fuscantaria* on the 22nd, *Triphæna interjecta* on the 23rd, *Agrotis puta* on the 24th, and on Aug. 25th came the first appearance of *Mamestra anceps*. The list may fitly be closed with the capture of a fine specimen of *Triphæna fimbria*, the first seen, on Sept. 2nd. Of the special Essex insects, *Clisiocampa castrensis* and *Phorodesma smaragdaria*, I cannot speak, as I live far from their haunts, and have not been able to visit them; but from what I have heard, I fear that much of the ground has been practically destroyed by the disastrous floods of last winter. I did once go to a spot where the food-plant of *P. smaragdaria* was growing nicely, but there was not a sign of a larva. The following is a list of the captures at light:—*Mania typica*, *Caradrina alsines*, *Plusia chrysitis*, *Rusina tenebrosa*, *Leucania pallens*, *Miana arcuosa*, *Cerigo cytherea*, *Hydrœcia nictitans*, *Noctua umbrosa*, *Luperina cespitis*, *Hadena oleracea*, *Triphæna ianthina*, *Lithosia lurideola*, *Lophopteryx camelina* *Pterostoma palpina*, *Odonestis potatoria*, *Cilix spinula*, *Hepialus sylvinus*, *Acidalia imitaria*, *A. aversata*, *A. emarginata*, *Epione apiciaria*, *Eubolia plumbaria*, *Cidaria pyraliata*, *Lomaspilis marginata*, *Selenia bilunaria*, *Melanthia albicillata*, *Cabera pusaria*, *Eupithecia centaureata*, *E. coronata*, *E. castigata*, *E. albipunctata*, *Crocallis elinguaria*, *Ephyra omicronaria*, *Emmelesia unifasiata*, *Hemithea thymiaria*, *Melanippe rivata*, *Anticlea badiata*, *Ligdia adustata*, *Ebulea sambucalis*, *Pyralis costalis*, *P. glaucinalis*, *P. farinalis*, *Botys urticalis*, *Pyrausta purpuralis*, *Endotricha flammealis*, *Herbula cespitalis*, *Pionea forficalis*, *Aglossa pinguinalis*. *A. cuprealis*, *Scopula prunalis*, *Paraponyx stratiotata*, *Cataclysta lemnata*, *Pterophorus rhododactylus*, *Aphonia colonella*.—(Rev.) W. CLAXTON; Navestock, Romford.

SOCIETIES.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*September 8th*, 1898.—Mr. J. W. Tutt, F.E.S., President, in the chair. Mr. Little, 17, Belgrave Street, King's Cross, was elected a member. Mr. F. Clarke exhibited some very admirable photographs of the eggs of Lepidoptera sent to him by the President. They included those of *Erebia embla*, *Chionobas jutta*, *Polyommatus bellargus*, *P. icarus*, *Gonepteryx rhamni* and *Spilosoma menthastri*. Mr. Edwards, specimens of *Abraxas ulmata* vars. from York. It was stated that neither on the present occasion nor when the var. was taken years ago did the ova produce dark imagines like the parents. Mr. West, specimens of *Forficula lesnei* from Box Hill and Reigate, at both of which places it was common. Mr. Lucas, a series of the local grasshopper *Mecastethus grossus*, from the New Forest, where it had this year occurred in some numbers. He kindly presented a pair to the Society's collections. Mr. R. Adkin, a series of *Smerinthus tiliæ*, and remarked on the variation to be seen in the central band. Mr. Turner, a yellow variety of *Callimorpha dominula*, bred from a Deal larva this year; bred specimens of *Myelois cribrella* from Benfleet, where the larvæ were most abundant; a bred example of *A. grossulariata* from Camberwell, having the space internal to the marginal spots of a brownish tinge, the rest of the wing surfaces were normal; and a series of *Aglaia urticæ* bred from larvæ taken at Box Hill and fed up in a greenhouse, having the usually large black blotch on the inner margin of the fore wings either entirely absent or represented by a few black scales. Mr. Moore, a series of well-marked blue females of *Polyommatus icarus* from Folkestone. Mr. Mansbridge, a series of under sides of the female of *Plebius ægon*, selected to show the ordinary range of variation in the species as it occurs in St. Leonards Forest. Mr. Montgomery, an exceedingly fine dark suffused male aberration of *Dryas paphia*, one or two bred from ova. Mr. Ashby, a tiny aberration of *P. corydon* from Riddlesdown, and a female of *P. ægon* from Oxshott showing blue splashes. Mr. Bishop, a beautiful bred series of *Geometra vernaria* from Guildford. During the interval, in which the Society could not meet, the rooms have been renovated and the electric light introduced.—Hy. J. Turner, *Hon. Rep. Sec.*

Kendal Entomological Society.—*September* 12*th*, 1898.—Mr. W. Wilson in the chair. After reading the minutes, a letter was read from the President regretting his absence, and dealing with the proposed work of the Society in compiling records of the local fauna. The meeting was fairly well attended, and two new members were elected. The room has been furnished with new tables, two dozen chairs, and supplied with gas. A hearty vote of thanks was accorded to Dr. Parker for the active interest he had taken in this matter on behalf of the Society. Four gentlemen exhibited, and it was hoped that more of the actively working members would contribute towards this most instructive and interesting portion of the evening's business in future. Mr. Holmes exhibited fine series of *Gonepteryx rhamni* and *Erebia blandina*, and some large specimens of *Spilosoma fuliginosa* (northern type) bred from larvæ. Mr. Littlewood, fine series of *Noctua baia* and *Apamea oculea* (very variable); also black form of *Xylophasia monoglypha* and *Agriopis aprilina*. Mr. T. Smith, *Pieris rapæ* (female) exceptionally small, and *Selenia illunaria* (autumn brood). Mr. Wright, a splendid variety of *Epinephele ianira* (female); ground colour lighter than usual, eye spots small, and a creamy white blotch on fore wing; somewhat similar to a specimen figured by Newman. Mr. Littlewood reported *Mania maura* common on treacle on Sept. 5th, though somewhat worn. Mention was made of the abundance of *Vanessa io* and apparent scarcity of *V. atalanta* in the district this year.

Birmingham Entomological Society. — *August* 15*th*, 1898. — Mr. G. T. Bethune-Baker, President, in the chair. Mr. John Lenich, Livingstone Road, Handsworth, was elected a member. Mr. C. J. Wainwright exhibited a series of females of *Volucella inflata* taken on hawthorn bloom in the New Forest last June. Mr. Bradley, a dark specimen of *Cidaria corylata* from Sutton; and a specimen of *Pemphredon*, probably *lugubris*, with a parasite on the disc of each wing. Mr. R. G. B. Chase, *Amphydasis betularia* var. *doubledayaria* from Edgbaston. Mr. Bethune-Baker, referring to the last exhibit and the spread of melanism, said that some years ago the black form of *Gracilaria syringella* was very rare; now it occurred freely in the neighbourhood of his house at Edgbaston; the black form of *Miana strigilis*, which is now quite common locally, was once rare and quite exceptional. Mr. C. J. Wainwright said that in his experience the black form of the species is the only one occurring locally now. Mr. A. H. Martineau showed *Ammophila hirsuta* from Tenby, South Wales, where it was taken by Mr. Chase. Mr. G. T. Bethune-Baker, two drawers containing palæarctic and tropical butterflies.—Colbran J. Wainwright, *Hon. Sec.*

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ON THE SPECIFIC DISTINCTNESS OF *CORIXA CARINATA* AND *C. GERMARI*, AND THE RESTORATION OF THE LATTER TO THE LIST OF BRITISH RHYNCHOTA.

By G. W. Kirkaldy.

One of the two British species of *Corixa* with a longitudinal central percurrent carina on the pronotum, enumerated by Saunders (Hem. Het. Brit. Isl., 1892, p. 340), is *carinata*, comprehending *carinata*, C. R. Sahlb., *sharpi*, Dougl. and Scott, *intricata*, D. & S., and also (not mentioned by Saunders) *germari*, Fieb., and *variegata*, Wallengr. There are certainly two distinct species amongst these, though the synonymy cannot be positively given until the various types have been re-examined. Some time ago, while reading White's "Notes on *Corixa*" (1873, Ent. Mo. Mag. x. p. 60), I remarked that he there describes the strigil in *C. sharpi* as being composed of "eight broad rows," that of *C. intricata* as having "about sixteen rather narrow and very irregular rows." This I have confirmed by an examination of examples in White's collection (recently presented by Mr. T. M. M'Gregor to the Perth Museum), which were received by him from Mr. Douglas. The only other differences that I can find are in the frontal fovea of the male, and perhaps in the palæ. It is not very easy to adjust the synonymy, as I have not seen any original examples of the other species, and little is to be gathered from most of the descriptions.

Sahlberg's original description of *carinata* (1819, Hist. Notonect., p. 12) applies equally well to either. Fieber's *carinata* is not Sahlberg's species, as is well known, but that described later by Thomson as *cavifrons*, while his *germari* is not separable by the brief description in the Bull. Soc. Nat. Moscou (1848, xxi. 1, p. 531); his later descriptions in Abh. böhm. Ges. Wiss.

(1851 (v.), 7, p. 250), "fovea frontali . . . oculos vix superante," and Europ. Hemipt. (1861, p. 99), "Stirngrube . . . die Augen fast überragend," would apply well enough to *intricata*, were it not that in the latter the frontal fovea *distinctly*, though by very little, extends backwards beyond the apical margin of the eyes. Fieber's figures in the 'Abhandlung' (tab. ii., fig. 26) do not give at all a good idea of the palæ. The same author's description of *cognata* (Eur. Hem., p. 99) applies well enough to *sharpi*, "Stirngrube . . . an das obere Augenende reichend." Puton (1880, Syn. Hém. France, p. 234) considers *germari*(=*variegata*=*intricata*) as only a colour-variety of *carinata* (=*cognata*=*sharpi*). Wallengren, however, in 1894, in his revision, in Swedish, of the Scandinavian Corixæ (Ent. Tidskr. xv., pp. 129–164) separates his *variegata* (1854) from *carinata*, giving long descriptions. As it is unnecessary to quote these descriptions in full, I give here merely a translation of the diagnoses (p. 159):—

"(1). Pronotum with not more than 8–9 yellow transverse lines; frons, sterna, and pleura yellow; base of abdomen (ventral aspect) blackish; 'legs' ['benen' = (I think) posterior tibiæ and tarsi] pale yellow. 1. VARIEGATA.

"(2). Pronotum with 10–12 yellow transverse lines; frons darker or paler brown; sterna and pleura black, with pale margins; abdomen brownish, with pale margins; at least the exterior margins of the 'legs' brown. 2. CARINATA."

At the end of the description of the former he adds:—

"Obs. Saunders regards this as identical with the following, from which, however, it may at once be differentiated by the smaller size, smaller number of yellow lines on the pronotum, and shorter pronotal carina, the paler colour underneath, the yellow design of the elytra, which is more extended and more obscurely (*otydligare*) divided into series, and lastly by the form of the anterior tarsi in the male; the extension farther backwards of the frontal fovea* of the latter forms another difference. Douglas, to whom I sent an original example, ... has pronounced his *C. intricata* identical with our species. It is similar also to Fieber's *germari*, but the latter is larger, the frontal fovea of the male extends scarcely beyond the angle of the eyes, sterna and pleura are blackish," &c.

The pronotal lines in both *intricata* and *sharpi* are much split, especially those in the centre, and it is not easy, if possible indeed, to state exactly how many lines there are; moreover, White's single male of *intricata* has certainly not less than eleven of these lines, and after a careful examination I cannot see any noteworthy difference in this respect between his *sharpi* and *intricata*. Moreover, Fieber (Abhandl., p. 250) states "lineis 9–10 nigris" in the diagnosis of *germarii*, and "lineis . . . 8–9

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* My rendering of this sentence is very free, but it is the only meaning I can gather from "hvarjämte uppehållsorten synes vara en annan."

. . . nigris" in the description, and the other colour-distinctions, both in his and in Wallengren's writings, do not appear to me important; and I do not think the size would be found to vary very appreciably in a large number of examples.

It seems best therefore to write the synonymy of these two species for the present as follows:—

1 **carinata*, Sahlb., 1819.	2 **germari*, Fieb., 1851.
*=*cognata*, Fieb., 1861.	*=*variegata*, Wallengr., 1854.
=*sharpi*, D. & S., 1869.	=*intricata*, D. & S., 1869.
=*carinata* (p.), Saund., 1892.	=*carinata* (p.), Saund., 1892.

And they may be separated as follows:—

carinata.	*germari.*
♂. Frontal fovea extending almost to the base of the frons; pronotal carina almost entire; strigil subcircular, consisting of eight rather broad, regular rows of striæ.	♂. Frontal fovea extending but little beyond the apical margins of the eyes; pronotal carina rather shorter than in *carinata;* strigil subtruncate oval, almost twice the size of the same organ in *carinata*, consisting of about sixteen rather narrow, very irregular rows of striæ.

I think also that the palæ in *carinata* are more twisted and rather blunter apically, and that the apex of the anterior tibiæ is rather thicker than in *germari*. Also, in *carinata*, there seems to be a row of about thirty-six "teeth" on each pala (concave side), disposed as follows, starting from the base:—Fifteen or sixteen rather blunt "teeth" somewhat cramped together, then one solitary blunt tooth, then five together, though further from each other than the fifteen or sixteen are from each other, then twelve or thirteen elongate tapering, somewhat curved "teeth" continuing almost to the apex of the pala. In *germari* (that is to say, *intricata*) there appear to be about forty all close together extending over a similar distance, and more uniform in shape. I do not wish, however, to place too much stress upon the accuracy of my observations upon this last character. As regards the females, I cannot yet detect any striking difference. Wallengren writes of *variegata* that in females the anterior tarsi are long, very narrowly and roundly knife-shaped; in *carinata*, "anterior tarsi sickle-shaped." In the males, nevertheless, the differences in the strigil and in the frontal fovea are quite sufficient for the separation of the two species.

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* Type to be examined.

ON THE NOMENCLATURE OF THE EUROPEAN SUBGENERA OF *CORIXA*, Geoffr. (RHYNCHOTA.)

By G. W. Kirkaldy.

Subgenera, although anathematised by entomologists—who, however, almost invariably employ them—are convenient in large genera (for example, *Corixa*, which contains probably not far short of three hundred species, of which more than fifty are European). This is more especially the case when, as in *Corixa*, the subgenera have been erected upon structural grounds, which, were it not that the genus is really, as a whole, homogeneous, would form good excuse for its description.

Flor had, in 1860, separated *coleoptrata*, &c., to form a new genus *Cymatia*, but the first attempt at the establishment of "sections" was made by Thomson (1869, Opusc. Ent. i. p. 27), when *Macrocorisa* (*geoffroyi*, &c.), *Glænocorisa* (*cavifrons*), *Cymatia* (*coleoptrata*, &c.), and an unnamed section (*striata*, &c.), which Thomson presumably intended to be the typical subgenus, were erected. Unfortunately the learned Swedish author did not take into account the fact that the typical subgenus (*i. e.* that to which the generic name itself is imparted) obviously must be that which contains the type of the genus. The genotype of *Corixa* is *striata* of Geoffroy (=*geoffroyi*, auctt.) and not *striata* of Linnæus, and therefore the subgeneric name "*Corixa*" must be conserved for the section containing *geoffroyi*, a new name being rendered necessary for the subgenus *Corixa*, auctt.*

In 1873 (Ent. Mo. Mag. x. pp. 62, 63) F. B. White erected two new subgenera, *Callicorixa* for *præusta* and its allies, and *Oreinocorixa*, synonymous with *Glænocorisa*. Puton (Syn. Hém. France, 1880, p. 234) incorrectly included *carinata* and *germari* in Thomson's *Glænocorisa*, with the diagnosis of which they do not conform; in fact, they belong, in every character, to *Basileocorixa*, the central longitudinal percurrent carina on the pronotum, which is also a conspicuous feature in *Glænocorisa*, being merely a superficial character, although apparently constant, and of some importance for specific differentiation. Saunders (1892, Hem. Heter. Brit., pp. 340, 341) revived White's lapsed *Oreinocorixa* for *cavifrons*, incorrectly reserving *Glænocorisa* for *carinata*. Lastly, Wallengren (Ent. Tidskr., 1894, pp. 159–161) recognised the identity of *Glænocorisa* with *Oreinocorixa*, correctly placing therein *cavifrons*, but erected an unnecessary (as shown above) new subgenus *Arctocorisa* for *variegata* (*germari*) and *carinata*.

The European subgenera appear to me to be as follows :—

1. *Cymatia*, Flor, 1860, et auctt.; type, *coleoptrata* (Fabr.).

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* I have proposed "*Basileocorixa*" (*i.e.* "dominant. *Corixa*"), type, *striata* (Linn.).

2. *Callicorixa*, F. B. White, 1873, et auctt. (plur. *Callicorisa*); type, *præusta*, Fieb.
3. *Basileocorixa*, n. n., 1898; type, *striata* (Linn.).
   = *Corixa* (*Corisa*), auctt.
   = *Corisa* et *Glænocorisa* (part.), Puton, 1880.
   = *Corixa* et *Glænocorisa*, Saund., 1892.
   = *Corisa* et *Arctocorisa*, Wallengr., 1894.
4. *Glænocorisa*, Thoms., 1869, et pl. auctt.; type, *cavifrons*, Thoms.
   = *Oreinocorixa*, F. B. White, 1873, et Saund., 1892.
5. *Corixa*, Geoffr., 1762 (restr. Kirk., 1898); type, *geoffroyi*, Leach.
   = *Macrocorisa*, Thoms., 1869, et auctt.

COLLECTING IN THE FENS.

By Russell E. James.

Arriving at Soham at 7.3 p.m. on Friday, July 22nd, I found Mr. W. O. Bullman waiting for me with his trap, and we made all haste to Wicken, as the night promised well—still and warm, with very light rain. During the drive, Mr. Bullman told me of the comparatively large numbers of *Hydrilla palustris* which had occurred in June, some forty to fifty specimens in all, and the name, in fact, is in everyone's mouth, any of the villagers with whom I chatted referring to it. It has been quite a local event. Although, of course, I was much too late for this species, I was anxious to be off, and after a good meal (Mrs. Bullman understands entomological appetites) got down to the fen about half-past eight, and found Mr. Baily all ready for me as arranged. He said the season had been only a moderate one except for *H. palustris*, but thought the night promised well: disappointment, however, was in store for me, as, after netting a few things at dusk, a fog got up and utterly ruined treacle and light. Although it cleared off in twenty minutes, it seemed to have done for the moths, nothing flying afterwards.

I was only staying four days, so that the first night a blank was disheartening; but, as it turned out, this was the only fog I had, and light was better afterwards—the Monday, when we stopped down in the fen until day dawned, being a really first-class night,—in fact, the best of the year, according to Baily. Treacle paid more or less each night, both in the fen and in the drove above; and in the fen, bark nailed on to posts (tried this year as an experiment) proved to be far better than the orthodox grass-knots, and much easier to work. This idea should be useful in salt marshes and elsewhere. Everything was very backward, and the species at light were curiously mixed. In the daytime *Papilio machaon* occurred in every stage,—ova and larvæ of all sizes fairly plentiful, one pupa, and at the same time worn imagines on the wing. *Hyria muricata* was walked up when the sun shone, with *Acidalia immutata* and a few *Herminia cribralis*, but day work was not pursued very ardently, as I was overwhelmed with setting. For a collector who conscientiously keeps up with his setting, a visit to Wicken, with good nights at light and treacle, is really hard work.

At dusk, geometers abounded, especially round the buckthorns, where *Collix sparsata*, *Scotosia rhamnata*, and *S. vetulata* literally swarmed, including a few finely marked females of *S. rhamnata*. The sallows were nearly as crowded with numbers of *Epione apiciaria* and *Cabera exanthemaria;* whilst on the still evenings *Nudaria senex* occurred at very early dusk in hundreds all over the fens, and again much later at light, but the very slightest wind seems to affect it, so weak and flimsy is its flight, and unless circumstances are quite favourable, you scarcely see a specimen. Neither of the three buckthorn feeders ever appeared at light, although *S. rhamnata* twice occurred at treacle. *Hydrelia unca* also flew at dusk, and although it was very late for the species, fully half of the short series obtained were in fine condition.

Of larger things, *Hepialus humuli* was swinging about everywhere, and *Odonestis potatoria* females dashed about over the sedge. Other dusk captures were *Lithosia griseola* and its var. *stramineola*, *Leucania conigera*, *Cœnobia rufa*, *Herminia cribralis*, *Plusia chrysitis*, *Acidalia immutata*, *A. emarginata*, *A. scutulata* (in any numbers), *Timandra amataria* (common in the drove), *Hypsipetes elutata* (some pretty forms), and *Cidaria pyraliata*.

By beating the hedgerows in the drove (the only beating I did), I took three lovely *Aventia flexula*, *Acidalia imitaria*, *Scotosia rhamnata*, *S. vetulata* (the best females of these last two were beaten here), *Hemithea thymiaria* (very abundant and fresh), *Triphæna interjecta*, and more *Cidaria pyraliata*.

Treacle was almost monopolised by common species, mostly Leucanias; *L. pallens*, *L. impura*, and *L. pudorina* occurred about equally, *L. lithargyria* not quite so common, and *L. conigera* distinctly scarce. Of the last-named only a single specimen occurred in the fen, and the remaining dozen or so in the drove. *L. lithargyria* also largely favoured the drove, and some of the finest specimens were taken on the way home after light, when everything else had gone, bar an occasional dissipated-looking *Xylophasia polyodon*. I have frequently noticed elsewhere that this species is a very late visitor. *Apamea gemina* was common, but worn, and two fine *Agrotis ravida* were boxed (the first specimens of the season), and odd *Cosmia diffinis*, *Acronycta* *aceris*, *A. psi*, *A. tridens*, *Hadena pisi*, and *Mamestra anceps* occurred from time to time.

Although a fair number of things came to light each night but the first, the red letter night was Monday, the 25th, when nearly all the best things were taken, and common species were very thick. So good was the night that I lengthened my four days' stay to five, in the hope of another like it, but although the Wednesday promised quite as well, a heavy storm of rain about 10.30 spoilt it.

The following were the best species taken, many of them, as will be seen, very much behind their time. *Sphinx ligustri* and *Smerinthus populi* (one each at a neighbouring sheet on the 25th), *Earias chlorana* (three worn specimens), *Nola cucullatella* (a few only), *Nudaria senex* (abundant), *Lithosia griseola*, commonly, and its var. *stramineola*, rarely; *Chelonia caia*, very abundant, including a rather nice pale form; and *Odonestis potatoria*, even commoner, a fine pale yellow male and some intermediate forms being taken. This species turns up directly the lamp has been lit, and by the time *C. caia* comes on its flight seems nearly over.

Lasiocampa quercifolia was scarcely out, only about a couple of dozen specimens occurring during the visit, and *Bombyx neustria* was only just starting. Four very fair *Macrogaster arundinis* turned up on the 25th (males of course), and on the same night four species of Notodontidæ, viz. *Lophopteryx camelina*, *Ptilodontis palpina*, *Notodonta dictæa*, and *N. ziczac*, the latter occurring singly on several nights. *N. dictæa* was netted immediately after two *Cucullia umbratica*, and until examined at home was put down as a third specimen of that species, as flying round the lamp they looked very similar.

A few *Leucoma salicis* turned up each night, and a fine *Cymatophora ocularis* on the 27th, evidently, from its condition, only just out. Among Noctuæ, *Leucania pudorina* took a long lead, and was far commoner than its near neighbours *L. pallens* and *L. impura*, which perhaps slightly outnumbered it at treacle. *Cœnobia rufa* occurred in numbers on the last night only, when a nice series was taken of pale, dark grey, and reddish forms. *Nonagria hellmanni* and *Calamia phragmitidis* were not out, neither were the second broods of *Arsilonche venosa* and *Arctia fuliginosa*, but *Cleoceris viminalis* was just coming, and six beauties were taken on the 25th, and another on the 27th; all these were boxed whilst fluttering up and down the lamp panes with some difficulty, owing to the crowds of Crambites. Several belated Noctuas put in an appearance, all very worn, except *N. plecta*; but the Agrotids were absent, except for one or two *A. exclamationis*, which, however, swarmed at treacle. *Herminia cribralis* occurred frequently, and although very worn, were not quite so bad as those taken at dusk and in the daytime.

Among the Geometers, *Epione apiciaria* was obtained in anything like numbers on one night only, the 23rd, although always common at dusk; whilst its sallow companion—*Cabera exanthemaria*—occurred every night. The abundance of *Acidalia immutata* was the feature of the group, however; it was the only species to show up on the first and foggy night, and each night afterwards it occurred in very large numbers, and in the finest possible condition. One individual specimen which had oiled itself in the lamp in a well marked way turned up on three consecutive nights, and each time I thought for the moment that it was *Corycia taminata*, which, on account of its curious oil-marks, it strikingly resembled. *Hyria auroraria* occurred on the 27th (rather an unusual species, surely, at light) and a very fair *Cidaria sagittata*, which is very scarce just now in the fen, on the 25th. *Cidaria testata* came next in point of numbers to *A. immutata*, the specimens striking me as being very large and pale. *Cidaria pyraliata* and *Pelurga comitata* occurred frequently, whilst *E. subumbrata* and *E. valerianata* among the Eupitheciæ, and two belated though very fair *Lobophora sexalisata* complete the list of captures in this group. *Nascia cilialis*, among the Pyrales, was common and in fine condition on the 25th, but scarce other nights.

I borrowed a bicycle on the last morning, meaning to ride to Tuddenham, but the machine being a low one, and being myself unusually endowed with length of limb, I developed such a cramp in the knees by the time I arrived at Fordham, that I gave up the idea, and turned again into Chippenham Fen, where I had already spent one morning. *Bankia argentula*, late as it was, was still plentiful, and for the most part in good condition. I took a very nice series, including two varieties with the bars quite close together. Four *Hydrelia unca* occurred among them, and *Hyria auroraria* was walked up not uncommonly from the reed beds, together with a few *Acidalia immutata*, *Herminia cribralis*, five *Lithosia mesomella*, and two nice *Toxocampa pastinum*. Four *Acidalia emarginata* were beaten from privet near the sides of the dykes, and *Macaria liturata* occurred among the pines at the edge of the fen.

Chippenham Fen is exceedingly pretty, the trees adding a beauty which is wanting at Wicken. I believe the greater part is private and preserved, but if permission could be obtained I am sure it would well repay systematic working, which could easily be done from Fordham.

Larvæ I am afraid I neglected entirely, except for intermittent hunting on the dwarf sallows, which produced some twenty larvæ of *Clostera reclusa* in various stages of growth. I left early on the Thursday morning for Fordham, after a most enjoyable visit; and in conclusion would say that anyone visiting Wicken could not possibly do better than stay with Mr. W. O.

Bullman, if his rooms are vacant, as he thoroughly understands collectors' ways, and makes one exceedingly comfortable in every respect.

3, Mount View Road, Crouch End, N.

NOTES ON LEPIDOPTERA IN 1897.

By Claude A. Pyett.

The influence of weather upon collecting has been remarkably evidenced during the year, but on the whole it has been fairly productive of insects. There was no winter to speak of, if by winter is understood a continuance of frost and snow; but the weather during the opening months of the year was very unsettled and changeable, and but for an occasional specimen of the Hybernidæ collecting was out of the question. May, which ought to be *the* month for the lepidopterist, was showery and cool right up to the third week, and insects were consequently very late in emerging, whilst vegetation was likewise very much retarded. The woods, which with the advent of June are generally with verdure clad, presented a wintry appearance, and the oaks and poplars were only just showing for leaf; whilst May was well on the wane before the hawthorn blossomed. In fact, everything, both in the insect world and plant-life, was a month late. Commencing from July, the summer on the whole has been fine and dry, insects on the wing have been fairly plentiful, and the wet spring is being counterbalanced by a brilliant autumn.

My collecting has been principally confined to the Micros, and the first to come under notice are *Roslerstammia erxlebella*, *Gelechia cerealella*, *G. nanella*, and *Lithocolletis tristrigella*, the captures of which are interesting, as these species had not previously been recorded for the county, and they are therefore additions to the 'Suffolk List of Lepidoptera,' compiled by the Rev. E. N. Bloomfield, who has kindly assisted me in identifying specimens. All four species were obtained through a careful inspection of walls and wall-ledges in Ipswich, and I rather wonder this mode of collecting is not more often heard of, as my experience has been that it pays even better than palings. An old crumbly wall in an unexposed situation is a favourite haunt of those two pretty species, *Argyresthia brockella* and *A. gœdartella*, of which I can always rely on getting a long series in season. I have also found *Œcophora lunaris* to be common and widely distributed in the town, this year boxing some fifty specimens in one afternoon. The list of wall captures also includes *Ephestia kühniella*, *Pœdisca bilunana* (two), *Stigmonota regiana* (two), *Batodes angustiorana* (several), *Semasia wœberana* (two), *Gelechia leucatella* (two), *G. domestica* (common), *Dasycera sulphurella* (several), *Retinia buoliana*, *Hedya ocellana*, *Tortrix forsterana*, *T. ribeana*, *T. heparana*, *Depressaria applana*, *Prays curtisellus*, *Cnephasia nubilana*, *Dictyopteryx lœflingana*, *Lithocolletis faginella*, *L. ulmifoliella*, *Aphomia sociella*, *Eudorea cembræ*, *E. frequentella* (common), *Gracillaria syringella* (common), *Grapholitha nævana*, *G. trimaculana*, *Coleophora nigricella*, &c. Visits to the woods at Bentley the latter end of May produced *Herminia barbalis*, *Eudorea ambigualis*, *Plutella cruciferarum*, *Incurvaria mascuella*, *Gracillaria swederella* (plentiful), *Coccyx hyrciniana*, *C. argyrana*, *Dicrorampha plumbana*, *Adela viridella* (swarming), *Cnephasia musculana*, *Phlœodes tetraquetrana* (several), *Swammerdamia griseocapitella*, *Glyphipteryx fuscoviridella* (several), *Eupœcilia maculosana* (abundant), *Nepticula ? argentipedella*, *Roxana arcuana*, *Laverna fulvescens*, &c. In Ipswich and surrounding neighbourhood I netted *Nephopteryx roborella* (at Sproughton), *Carpocapsa splendana*, *Crœsia bergmanniana*, *C. holmiana*, *Hedya dealbana* (common), *Gelechia populella*, and several of the commoner Crambidæ, *Elachista cygnipenella* and *E. rufocinerea*. *Depressaria liturella* was taken at Leiston, whilst among the frequenters of my house were *Tinea biselliella* (abundant), *T. tapetzella*, *T. ferruginella*, *Aglossa pinguinalis*, *Endrosis fenestrella*, *Ephestia elutella*, *Gelechia domestica*, *Œcophora pseudospretella*, and *Œ. fuscescens*.

To turn to the Macros, my diary records, amongst others, the following:—*Sphinx ligustri*, *Smerinthus tiliæ*, *Cucullia umbratica*, *Biston hirtaria*, *Hemerophila abruptaria*, *Eupithecia assimilata*, *Hypsipetes impluviata*, *Eugonia fuscantaria*, *E. tiliaria*, *Catocala nupta*, &c., all taken at light in the town; whilst on palings I found *Noctua triangulum*, *Caradrina cubicularis*, *Nola cuculatella*, *Acidalia aversata*, *A. trigeminata*, *Orgyia antiqua*, *Bryophila perla* (common), *Eupithecia castigata*, *E. rectangulata*, *E. sobrinata*, &c. Day collecting at Bentley Wood resulted in the following captures:—*Cilix spinula*, *Ephyra punctaria*, *Venilia maculata* (abundant), *Panagra petraria*, *Euclidia mi*, *Melanippe hastata*, *M. rivata*, *Fidonia piniaria; Arctia mendica* and *Corycia temerata* were also seen.

In July, during my holiday at Stafford, I observed the following species at electric light:—*Pygæra bucephala*, *Amphidasys betularia* var. *doubledayaria*, *Leucania comma*, *Agrotis exclamationis*, *Fidonia piniaria*, *Arctia caia*, *Mamestra persicariæ*, *Cidaria dotata*, *Melanippe montanata*, *Abraxas grossulariata*, *Tortrix fosterana*, &c. I also paid a visit to Cannock Chase, where, though unprovided with a net, I was fortunate in being able to secure specimens of *Aspilates strigillaria*, a nice series of *Eupithecia nanata*, *Acidalia inornata*, *Pleurota bicostella*, *Grapholitha germinana*, *Tinea fuscipunctella*, *Gelechia leuculella*, *Sericoris lacuana*, and other commoner species.

Ipswich: September, 1898.

TWO NEW COCCIDÆ FROM LAGOS, W. AFRICA.

By T. D. A. Cockerell, N. M. Agr. Exp. Sta.

Lecanium strachani, n. sp.

♀. Perfectly flat, very broad; length and breadth each about 5 mm.; anterior margin rounded; hind margin truncate. Light brown, the dorsal surface covered with glassy secretion, which in the middle of the back is more or less broken up into small oval plates. Genital aperture surrounded by cottony matter, which does not project beyond the margin of the scale. Legs and antennæ well-developed, light brown; antennæ 8-segmented, formula 3415(268)7. Marginal spines numerous, 66 $\mu\mu$ long. Skin after boiling colourless, with only very minute glands. The following measurements are in $\mu\mu$:—

Antennal segments:—(1) 66, (2) 50, (3) 116, (4) 83, (5) 58, (6) 50, (7) 41, (8) 50.

Coxa 215, femur with trochanter 315, tibia 249, tarsus 99.

Egg in body of ♀ 265 × 166 $\mu\mu$.

♂. Scale glassy, quite ordinary.

Hab. Lagos, on *Anona squamosa*. An interesting and distinct species, collected by Dr. H. Strachan, after whom it is named.

Icerya seychellarum (Westw.), race; *albolutea*, n. race.

♀. On under side of leaf; about 5 mm. long and 4 broad; dark red, resting on a cushion of yellow and white cotton. Dorsum entirely covered with bright yellow cotton. From the sides there radiate thick tufts (about 3 mm. long and nearly 1 broad at base) of cotton, which are white beneath and bright canary yellow above. Apparently no well-formed ovisac, but a lot of loose cottony secretion. Antennæ 11-segmented; the following measurements of the segments are in $\mu\mu$:—(2) 99, (3) 99, (4) 66, (5) 50, (6) 83, (7) 83, (8) 83, (9) 83, (10) 99, (11) 157. Width of anterior femur 149 to 199 $\mu\mu$.

Hab. Lagos, on *Anona squamosa*, collected by Dr. H. Strachan.

This is not related to *I. ewarti*, which Newstead described from Lagos, but is closely allied to *I. seychellarum* and *I. crocea*, although it seems not to have the glassy or silky filaments of those species. For the present, it may be treated as a race or subspecies of *seychellarum*. The only material of *I. seychellarum* I have seen is a small quantity in alcohol kindly sent to me by Dr. L. O. Howard; it was collected in Mauritius, and sent to the Department of Agriculture by Mr. D. Morris of Kew. Comparing this with *albolutea*, I find the antennæ almost the same, but segment 3 measures 116 $\mu\mu$, 4 is 83 $\mu\mu$, and there are other such small differences, which may not be constant. The legs of *seychellarum* are darker than those of *albolutea*, with very curved tarsi, and the bristles on the femur and tibia are stronger and longer. The anterior legs of the two forms measure as follows in $\mu\mu$:—

	Coxa	Trochanter	Femur	Tibia	Tarsus	Claw
I. albolutea	331	182	516	533	232	66
I. seychellarum	398	265	514	580	265	66

NOTES AND OBSERVATIONS.

Larvæ of Smerinthus ocellatus destroyed by Wasps.—Dr. Gardner informs me that the depredations of the wood-wasp deprived him this summer of a large and promising brood of *S. ocellatus.* For long he noticed that the tale of caterpillars was diminishing, and only discovered the cause by accidentally observing one of the wasps engaged in his act of murder and robbery combined. The wasp planted himself on the back of an unfortunate larva, and deliberately cut him in two with his jaws, seizing the capital half, carefully tucking in the head, and flew off with it. Soon after he returned for the caudal half.—Harold Hodge; 6, Crown Office Row, Temple.

A New Habitat for L. lycidas.—There are now a sufficient number of collectors who visit Switzerland every year in pursuit of our sport to make it a matter of interest that I can record the capture of six specimens of the above insect at St. Nicolas on July 18th of this year. I was obliged to leave that same day; but I showed my captures to the Rev. C. Buckmaster, who writes me word that he followed up my path of luck on the following day, and was also successful in taking *L. lycidas.*—(Rev.) F. E. Lowe; St. Stephen's Vicarage, Guernsey.

Dicrorampha flavidorsana, Knaggs.—Through the courtesy of Dr. Knaggs and Mr. C. G. Barrett I have had the opportunity of examining the type of *D. flavidorsana*, together with series of *alpinana*, Staint., and *quæstionana*, Zell., and also the examples of *D. petiverella*, referred to by Dr. Knaggs in his paper (*ante*, pp. 201–203). All these specimens were subsequently exhibited at a meeting of the Entomological Society of London. Dr. Knaggs has already clearly shown, in the article cited, that the name *flavidorsana* is the prior one for the insect we have long known as *D. alpinana*, Staint., and more recently as *quæstionana*, Zell. There is no doubt whatever that all three descriptions apply to the same species; and it is equally beyond contention that *flavidorsana* is much earlier than *quæstionana.* The 'Manual' name cannot stand, as a *D. alpinana* was described by Treitschke in the year 1830; and this is not the same species as that referred to as *alpinana* by Stainton. Some more or less aberrant specimens of *D. petiverella* were at one time doubtfully referred to *D. flavidorsana*, and it is probably due to this fact that the latter is so generally considered to be a variety of the former. In 1881 I captured and bred specimens of *D. flavidorsana* in North Devon, and published a note on the occurrence at the time (Entom. xiv. 159). Several of the Micro-lepidopterists of that date, to whom I showed the specimens, held the opinion that they were *alpinana* of the 'Manual,' and in this view they are now proved to have been correct. At the same time, however, they were in error in maintaining that the insects had nothing to do with *flavidorsana*, which they insisted upon relegating to *D. petiverella* as a form of that species.—Richard South; 100, Ritherdon Road, Upper Tooting, S.W.

The Insect Fauna of Hastings and St. Leonards.—The Rev. E. N. Bloomfield has published a third 'Supplement' to this local list. A large number of additions are brought forward.

British Dragonflies.—We note that the subscription price of the work on 'British Dragonflies,' by Mr. W. J. Lucas, to be published by Mr. L. Upcott Gill, of the Strand, London, has been raised to fifteen shillings; and it is intimated that the price will be further increased to a guinea on publication.

Larvæ of Tinea vastella infesting the Horns of the Antelope.—We referred (*ante*, p. 168) to a letter on this subject, published in 'Nature' for June 9th last. In the number dated September 15th of the same journal the matter is further considered, and from this it would appear that the larva in question does attack the living horns.

The Present Prices of the Older Works on British Entomology.—As enquiries are frequently being made respecting the above, it has been thought that a few particulars on the subject might perhaps be of more or less general interest. With a view, therefore, of obtaining some idea of the current market value of such books, the catalogues of various Natural History booksellers, both British and foreign, have been consulted; and the results, so far as concerns the works enumerated below, are submitted for the information of those who may be curious in such matters. Other books will be referred to as opportunity offers.

Albin (E). 'Natural History of English Insects.' Illustrated with 100 copper-plates, curiously engraven from the life, and exactly coloured by the author; 100 hand-coloured plates; and 100 leaves of text. Large 4to. Date 1720.—This work is not often found mentioned in catalogues; but occasionally a copy, bound in calf, may be had for about £2 12*s*. 6*d*.

Albin (E.) and Derham (G.). 'Insectorum Angliæ Naturalis Historia.' 100 plates. Date 1731.—This is quoted in a foreign catalogue at 15 marks.

'Aurelian,' The. Harris (Moses). Date 1778. With forty-four coloured plates.—Not often quoted in catalogues. A "fine copy" was offered in the year 1891 at £4 10*s*. The third edition (1794), with 46 coloured plates, has been listed at £1 15*s*.; whilst the Westwood edition, brought out in 1840 at the price of £5 5*s*., has been marked in catalogues during the past ten years at from £2 to £3 3*s*.—The late Mr. Stainton, referring to this edition of the 'Aurelian' in 1856, when the work was selling at £4 4*s*., says:—"The colouring is very gaudy, and little resembles the productions of nature. For babies, both young and old, who like to look at picture-books, it may not be uninteresting; but as a nursery toy it is rather expensive."

Aurelian's 'Pocket Companion,' The. One coloured plate. Date 1775. By the same author as the above.—Present price about 2*s*.

Curtis (J.). 'Farm Insects: being the Natural History and Economy of the Insects Injurious to the Field Crops of Great Britain and Ireland; and also those which Infest Barns and Granaries.' Sixteen coloured plates (1860).—The above edition is on sale at £1; and a later edition (1883) at 18*s*. 6*d*.

Curtis (J.). 'The Genera of British Lepidoptera.' Thirty-five coloured plates (1858).—May be had from 15*s*. to £1 8*s*.

Curtis's 'Illustrations and Descriptions of the Lepidoptera found in Great Britain and Ireland.' 193 coloured plates (1862).—Has been offered at £9 12*s.* 6*d.*

Curtis (J.). 'British Entomology: Illustrations and Descriptions of the Genera of Insects found in Great Britain and Ireland.' 770 coloured plates. Sixteen volumes bound in eight (1862).—The above was published at £28. It is sometimes quoted in catalogues at about £21. The original edition was published 1824–1839, and copies are occasionally offered at from £16 to £20. There is still another edition, with the contents systematically arranged. This is dated 1823–1840; and the present price is £21.

Donovan (E.). 'Natural History of British Insects.' Ten volumes. Demy 8vo. With 360 coloured plates (1782–1801).—A picked copy, bound half-morocco, is quoted at £3 3*s.* Another edition, sixteen volumes, large 8vo, date 1802–1813, with nearly 600 coloured plates, is offered in a catalogue for this year at £5 10*s.* and £6 6*s.* per copy.

Duncan (J.). 'Natural History of British Butterflies.' 12mo. Thirty-four coloured plates. Date 1835. Price from 3*s.* to 6*s.*—About the same figures seem to rule for the volume on 'Moths' by this author, which was published in 1836.

'Entomological Magazine,' The. (Edited by E. Newman.) Five volumes. 8vo. With woodcuts and plates. Date 1832–1838.—Sets of this periodical are now rather scarce, and are quoted at from £2 15*s.* to £3 10*s.*

'Entomologist's Weekly Intelligencer,' The. (Edited by H. T. Stainton.) The first number was published in 1856; and the last, concluding vol. x., in 1861.—Complete bound sets range in price from £2 2*s.* to £3 3*s.*

'Entomologist,' The Weekly. (T. Blackburn.) Date 1862–1863.—Does not appear in any catalogue that I have had an opportunity of seeing.

Harris (Moses). 'An Exposition of English Insects.' Date 1782. A 4to volume. With thirty-one copper-plates, coloured. Sometimes offered at £1; but in a catalogue of this year's date the price is £1 10*s.* for a nicely-bound copy.—An earlier work (1776), bearing the above title, with eleven coloured plates and a frontispiece, has been several times quoted in the catalogues of a foreign bookseller at 4 marks.

Haworth. 'Lepidoptera Britannica.' Date 1828. 8vo, calf gilt. Quoted at 6s. — In a German list for 1891, vols. i., ii., and iv. (1803–1828) were offered for 18 marks; and the "Prodromus" for 2½ marks.

Humphreys (H. N.). 'Genera of British Moths.' With sixty-two coloured plates (1861). Present price from £1 5*s.* to £2 2*s.*—'The Genera and Species of British Butterflies,' with thirty-two coloured plates, by the same author (1868), may be obtained at 6*s.*

Humphreys (H. N.) and Westwood (J. O.). 'British Butterflies and their Transformations.' Forty-two coloured plates. 4to. (1841.)—Quoted at £2 2*s.* Another edition (1848) is priced at £1 10*s.*

Humphreys (H. N.) and Westwood (J. O.). 'British Moths and their Transformations.' Two volumes. With 124 coloured plates. (1843–1845.)—This edition is offered at £5 10*s.*; but the 1849 edition is £1 10*s*. less; and that of 1854 is quoted at £4 10*s*.—The 'Butterflies and Moths,' three volumes, all of the first edition, uniformly bound in russia, are put down at £7 10*s*.

Lewin (W.). 'On some Rare British Insects (Lepidoptera).' Date 1807. 4to. With two coloured plates.—Quoted in a German list at 2 marks. A previous edition (1793) has been offered at 1*s*. 6*d*.

Lewin (W.). 'Insects (Lepidoptera) of Great Britain.' Text in English and French. With forty-six coloured plates. 4to. Date 1795.—Copies in good condition and bound in calf are sometimes offered at £1 1*s*.

Morris (F. O.). 'History of British Butterflies.' With seventy-one coloured plates. (1860 and 1864 editions).—Ranges in price from 15*s*. to £1 1*s*., according to binding. The fifth edition (1870), with seventy-two coloured plates, has been quoted at 7*s*. 6*d*. per copy.

Morris (F. O.). 'History of British Moths.' Parts 1–32. With sixty-four coloured plates. (1859–1863).—The subscription price was £3 3*s*.; but copies of this edition are now quoted at 18*s*. Subsequent editions, in four volumes, range from £2 10*s*. to £4 7*s*. 6*d*.

Samouelle (G.). 'Entomological Cabinet.' (1832–1834).—An incomplete copy is set down in a recent catalogue at 10*s*.

Samouelle (G.). 'The Entomologist's Useful Compendium; or an Introduction to the Knowledge of British Insects.' With twelve coloured plates. (1819).—This was published at £1 18*s*., and is now quoted at from 4*s*. 6*d*. to 10*s*. The edition with plain plates, published at £1, may now be had at from 3*s*. to 5*s*.

Stainton (H. T.). 'Insecta Britannica: Lepidoptera Tineina.' Ten plates. (1854).—Ranges from 18*s*. to £1 1*s*., according to binding.

Stainton (H. T.). 'Manual of British Butterflies and Moths.' Two volumes. (1857–1859). From 6*s*. 6*d*. in cloth, to 14*s*. in calf binding.

Stainton (H. T.). 'The Natural History of the Tineina.' Thirteen volumes. Eighty coloured plates. Text in English, French, German, and Latin. (1855–1873).—This fine work was published at about £8; in a recent list it is quoted at £5 15*s*.; but in other catalogues the price is rather higher.

Stephens (J. F.). 'Illustrations of British Entomology.' Twelve volumes. Royal 8vo. One hundred coloured plates. (1828–1846).—This work was published at £21, and may now be had for £5. Odd volumes are sometimes offered at from 5*s*. to 10*s*. each.

Stephens (J. F.). 'Systematic Catalogue of British Insects.' (1829).—Quoted from 3*s*. 6*d*. to 4*s*. 6*d*. The original price was £1 7*s*.

'Substitute,' The. (Edited by H. T. Stainton.) Date 1856–1857.—The name of this periodical does not often occur in catalogues. It was quoted last year at 4*s*. 6*d*.

Westwood (J. O.). 'Introduction to the Modern Classification of Insects. Two volumes. Coloured plates. (1839–1840). The present price ranges from £1 11*s*. 6*d*. to £2 2*s*., according to quality of binding.

Wilkinson. 'British Tortrices.' (1859).—Quoted in a catalogue of this year's date at 10*s*. 6*d*.; but in a German list of 1891 it stood at 26 marks.

Wilkes (B.). 'One hundred and twenty Copper-plates of English Moths and Butterflies: representing their Changes into the Caterpillar, Chrysalis, and Fly states; and the Plants, Flowers, and Fruits whereon they Feed; with a Natural History of the Moths and Butterflies; describing the Method of Managing, Preserving, and Feeding them. 4to, cloth. 1773.—The above was published at £9 9*s*., and may now be had occasionally at £2 10*s*. or £3.

Wood's 'Index.' Large paper edition. 1839.—From £3 3*s*. to £5 5*s*., according to condition and colouring. In a German list, of about two years ago, a copy was offered at 30 marks.

The Westwood edition of the above (1854) is quoted at from £2 10*s*. to £3 10*s*.; while the Westwood 'Supplement' may sometimes be obtained separately at about 10*s*.

R. S.

CAPTURES AND FIELD REPORTS.

COLIAS EDUSA IN NORTH-WEST LONDON.—On Aug. 20th, as I was on my way to the Zoological Gardens, I saw a male *C. edusa* near Regent's Park. The day was a warm one, and the specimen was evidently freshly hatched and was flying strongly, but I did not attempt to catch it, as it looked so lovely in the sunshine, and I have a good series. Is this butterfly often seen in London? The species was common at Devonport in 1892, but scarce there in 1893 and 1894.—F. D. WELCH; 8, Brandram Road, Lee, S.E.

COLIAS EDUSA IN KENT.—I took a male specimen in fine condition on the sands near Sandwich, on Aug. 20th.—W. G. LUCAS; Kingston-on-Thames.

COLIAS EDUSA IN SUFFOLK.—A male specimen of *C. edusa* was caught here on Sept. 10th.—EDWARD RANSOM; Sudbury, Suffolk, Oct. 4th, 1898.

SECOND BROOD OF SMERINTHUS POPULI.—On May 25th I took two specimens of *S. populi*, male and female. The male I killed, keeping the female to obtain eggs. The eggs hatched out on June 9th, and in due course the caterpillars went to ground. I was surprised on looking in my box on Aug. 13th to find a perfect insect of *S. populi*, several others emerging a few days later. Is this not of unusual occurrence? as the chrysalids were not forced in any way; or is the species usually double-brooded?—JACK FORSTER; Arundel House, Hayling Island, Hants.

[There are previous records of this species attaining the perfect state in late summer or early autumn; the most recent cases are referred to, Entom. xxix. 315, and xxx. 274.—ED.]

ACHERONTIA ATROPOS IN KENT.—A perfect specimen of *A. atropos* was taken in the Calverley Road, Tunbridge Wells, on Oct. 3rd last.—R. A. DALLAS BEECHING.

CUCULLIA ASTERIS NEAR WINDERMERE.—On Sept. 16th, noticing great quantities of golden-rod (*Solidago virgaurea*) growing in a wood to the north-west of Windermere Lake, I determined to beat for *Eupithecia* larvæ, and with the possible chance of turning up *C. asteris*. It was not long before a wriggling, shiny and brightly-striped larva fell into the umbrella, and I felt that my luck had not forsaken me. Though I had never seen it before I felt sure, from the description, that it was none other than *asteris*. I gave up beating, and by searching found three more. Two were quite full fed, and as the plant was well-nigh over, I do not doubt that others had turned. The next day I went in quest of the same insect in an opposite direction near Winster, and was greatly rewarded by again discovering this beautiful caterpillar, finding as many as seventeen; and on a subsequent search near the same ground on Sept. 19th, adding nearly two dozen more. I had no idea the species was so common, and a little systematic searching was all that was required. The larva is a very conspicuous object, and lies quite exposed near the top of the plant amongst the flowers, which it seems to eat in preference to the leaves. There are four distinct varieties as regards colour:—1, a pale yellowish green; 2, a darker olive-green tint; 3, a delicate pink; and 4, a similar pink ground, but having the two stripes on either side of mediodorsal stripe, which was in all cases a bright yellow, of a distinctly dark maroon colour. The plants in this place were not so far advanced, and though many of the larvæ were full-grown, some seemed to belong to a later brood. All but four had spun their cocoons by Sept 29th. A dried-up skin of a larva and one pupa of an insect very similar, if not identical, have been given me by a friend living near Lake Side. He found the two larvæ early in August, feeding on Michaelmas daisy in his garden. They certainly belong to the "sharks," and as certainly are not *chamomillæ* or *umbratica;* and my reason for doubting that they are *asteris* is that six weeks is a long period for the larval stage of any of this genus to extend over, and my *asteris* larvæ refused to eat Michaelmas daisy leaves, though they nibbled at the flowers. I wonder if they can possibly be *C. gnaphalii.* I believe the two larvæ have been taken in company in Darenth Wood. It is to be hoped that the one pupa which I possess will live to tell its own tale in course of time.—ARTHUR MILES MOSS; Kendal, Oct. 12th, 1898.

SPHINX CONVOLVULI IN ENGLAND.—Records of the capture of this species during September and October of the present year have been received as follows:—

Berkshire.—On Sept. 17th I had a female *S. convolvuli* brought to me, and on the 20th a male ditto, both taken within half a mile of my house.—W. E. BUTLER; Hayling House, Oxford Road, Reading, Oct. 1st, 1898.

Devonshire (*North*).—By the kindness of Dr. Ernest Gardner, of Ilfracombe, I was enabled to take several specimens of *S. convolvuli* towards the latter end of September. All were taken in the same garden, as they hovered round a large patch of the tobacco-plant in flower. With the regularity of clockwork they came down each night at 6.30. Variation in the light did not seem to affect them at all. Less than half an hour's work on two successive evenings brought eight specimens to the net. We could have taken more, but it seemed a pity to make too severe an onslaught on a fine species, so uncertain in its appearance in this country. One evening, Dr. Gardner tells me, there were as many as thirty of these great moths flying around the tobacco-plants at the same time. He had never come across the species in any stage in the district before. *Sphinx ligustri* and *Smerinthus ocellatus* he had met with, commonly breeding them every year.—HAROLD HODGE; 6, Crown Office Row, Temple.

Essex.—On Sept. 22nd I had a specimen of *S. convolvuli* brought to me, that had been taken at Stratford a few days before.—A. W. MERA; 79, Capel Road, Forest Gate, Sept. 26th, 1898.

Gloucestershire.—From Sept 20th to 24th I have had every evening the great pleasure of watching the flight of *S. convolvuli,* the very perfection of grace and power, as these fine insects swooped down upon my large *Nicotiana* bed, and darted from flower to flower, sucking out the honey with their long probosces while poised on quivering wing. Probably, altogether, a dozen were seen, of which my son and I took four, mostly in excellent condition.—(Rev.) ALEXANDER NASH; Standish Vicarage, Stonehouse, Glos., October 17th, 1898.

Hampshire.—Several specimens of *S. convolvuli* were taken at Christchurch during the month of September.—A. DRUITT; Christchurch, Hants.

Kent.—Two very fine specimens of *S. convolvuli* were captured here on Oct. 3rd.—R. A. DALLAS BEECHING; 24, St. James Road, Tunbridge Wells. From Sept. 19th to 24th my friend Mr. V. Horsley and myself captured eleven specimens of *S. convolvuli* hovering over beds of the tobacco-plant.—F. A. SMALL; 95, Westgate, Canterbury, Oct. 6th, 1898. I was fortunate in capturing a fine specimen of *S. convolvuli* near Tunbridge Wells on Oct. 3rd. I took a lovely specimen here a few years ago.—M. M. PHIPPS; Woodside View, Victoria Road, Southborough, Oct. 11th, 1898. From Sept. 17th to 24th I took nine specimens of *S. convolvuli* flying over tobacco-plants in our garden; and a worn one was brought to me by a boy, who found it on the pavement. Three of the nine were in good condition, but the others were only fair.—D. CHITTENDEN; Carlton Villas, Hunter Road, Willesborough, Ashford, Kent, Oct. 15th, 1898.

Middlesex.—In passing the church of All Hallows, Barking, near Tower Hill, City, last Tuesday, Sept. 20th, I saw a fine specimen of *S. convolvuli* near the church porch, but out of reach; a lad, however, dislodged it with his cap, and it was finally captured opposite the church, in Mark Lane Station, unfortunately somewhat rubbed by the summary method of dislodgment. This is the second specimen of *S. convolvuli* I have captured in the London district, the previous one being taken at rest about ten years ago, in Fernie Park Road, Crouch Hill.—HENRY A. KING; 5, Harringay Park, Crouch End, Sept. 24th, 1898.

Somersetshire.—My son Mr. A. Basil Cottam took two fine specimens of *S. convolvuli*, both in excellent condition, hovering over flowers of *Nicotiana affinis* at dusk in his garden at Bramblecroft, Bridgwater, last month. The first, taken on Sept. 23rd, is a male; the second, a fine female, was taken on the 25th. When he saw the last he had no net, so he struck it down with his straw-hat, and picked it up, stunned, but quite uninjured. He remarks that he saw others in his garden, but all were hovering over one particular plant of *Nicotiana*, though there were a number of other plants of it all round and in full bloom which the moths entirely neglected. A third specimen was taken in the garden of the adjoining house on Sept. 20th, but was much damaged by rough handling.—ARTHUR COTTAM; Eldercroft, Watford, Oct. 17th, 1898.

Suffolk.—The capture of several specimens of *S. convolvuli* at Henley and Westerfield, near Ipswich, has been recorded in our morning newspaper this week, under the heading, "Giant-moth in Suffolk." Apparently it is common this year.—CLAUDE A. PYETT; 28, Waterloo Road, Ipswich, Sept. 25th, 1898.

Surrey.—I received a specimen of *S. convolvuli* taken at Ewell on Sept. 21st.—A. FICKLIN, Junr.; Norbiton, Kingston-on-Thames. A nice specimen of *S. convolvuli*, which flew into a house at Hambledon about the end of September, was sent to me, and arrived in good condition.—W. ASTON; Fairfield East, Kingston-on-Thames. It may be of interest to record the capture of a specimen of *S. convolvuli* on Sept 29th, at Addlestone, Surrey, by my nephew. The insect was forwarded to me by post, alive. — E. H. TAYLOR; 5, Elsenham Gardens, Southfields, S.W. Between Sept. 14th and 17th I had four specimens of *S. convolvuli* brought me by boys, all of them having been found in one portion of the parish.—(Rev.) J. E. TARBAT; Holmlea, Weybridge.

Worcestershire.—Two specimens of *S. convolvuli* have occurred at Malvern; one was unfortunately caught by a cat and, as a matter of course, came to grief. The second was taken in a greenhouse, in fair condition. I have also heard of others having been seen flying over *Nicotiana affinis.*—W. EDWARDS.

NONAGRIA CANNÆ.—Mr. E. A. Bowles and myself obtained a grand lot of pupæ of *N. cannæ* at Horning in July last.—M. M. EDELSTEN; The Elms, Forty Hill, Enfield, N.

VANESSA ANTIOPA AT CHRISTCHURCH.—A very fine specimen of this insect was taken by Mr. T. Tapsell, of Christchurch, within a few miles of the town, in the second week in August. It was disturbed in a small plantation of oak, birch, and willow.—A. DRUITT; Christchurch, Hants, Oct. 1st, 1898.

CAPTURES IN THE TUNBRIDGE WELLS DISTRICT.—I have been fortunate in capturing several scarce insects this season, and from among them I should like to mention a few I have taken for the first time in this district, Two of them I think are of great interest, *Agrotis cinerea* and *Spilodes palealis*, as I never heard of either of these species being taken except on the chalk, and generally near the coast. One specimen of *Ennomos fuscantaria* is of a much lighter shade, less of the fuscous colour than some I have from York. Also *Apamea ophiogramma:* I believe I have taken this species here before, but am not quite certain, as the few previous specimens have always been too much worn to properly identify them; the present example is darker than some I have from Cambridge; it is also suffused with a very rosy tint, which gives it a pretty effect. I should also note that the *A. cinerea* is light brown in colour, instead of the more usual slaty grey tint.—M. M. PHIPPS; Woodside View, Victoria Road, Southborough, Kent.

GRASSHOPPERS AT SUGAR.—Mr. W. J. Cross, of Ely, sent me a pair of *Meconema varium*, and a female *Thamnotrizon cinereus*, which he took off his sugar, in the New Forest, on Sept. 16th. The former insect I have on two occasions found on sugar (*vide* Entom. xxx. pp. 28 and 76), but had not previously heard of the latter visiting it.—W. J. LUCAS; Kingston-on-Thames.

HELIOTHIS PELTIGERA AND XANTHIA GILVAGO.—A very good specimen of *H. peltigera* was taken in a clover-field at Aberporth, Cardigan, on Aug. 15th; and a fine specimen of *X. gilvago* was taken at light here about the middle of September, both of this year.—J. B. MORRIS; Maldon House, Maldon Road, Wallington, Surrey, Oct. 16th, 1898.

DASYCHIRA (ORGYIA) PUDIBUNDA IN OCTOBER.—This morning, Oct. 19th, a fine female of *O. pudibunda* emerged from a pupa in my breeding-cage. This cage was in a cool room, and consequently the pupa could not have been "forced."—E. T. B. REECE; Cardiff.

STAUROPUS FAGI AT EPPING.—On Sept. 20th, while beating in company with Mr. Garland, I took a nearly full-grown larva of *S. fagi.*—ALFRED ALDER; Albert Road, Leyton, Oct. 16th, 1898.

Ennomos autumnaria (alniaria).—This insect comes to the lamp outside my front door nearly every year. I took two specimens, male and female, last month (September), and I have a batch of eggs. Three years ago I had a similar batch, and the larvæ fed up very well, but instead of changing to pupæ they got diseased, and all died except one. I should be annoyed were this to happen again, so if any of my old correspondents would like to try their hands at rearing the insect, I shall be pleased to divide the eggs between us.—J. P. Barrett; 3, St. John's Villas, St. Peter's Footpath, Margate.

Hadena pisi: extraordinary abundance in the larval state.—Last month a friend drew my attention to the fact that the larvæ of *H. pisi* were to be obtained in great numbers at Shepherd's Bush. The locality turned out to be a large brickfield which had been in disuse for many years. Lying fallow for so long, the place has become a veritable wilderness. I noticed that the wormwood flourishes there exceedingly, and from the hollows the massed plants much resembled a miniature fir-forest, so dark and dense did they seem against the clear blue sky. In this tangled waste of thistles, nettles, yarrow, &c., the melilot asserted itself strongly—sometimes attained a height of nearly seven feet. The larvæ of *H. pisi* simply swarmed upon it, preferring it to any other pabulum, and large areas were completely devastated by these larvæ. To see them resting on the bared and bleached stems of the melilot, fully exposed to the fierce rays of the sun, was a most unusual sight on one of the very hottest days of the year. Within a stride a score could be obtained, and all forms of the larvæ known to me were represented. It is no exaggeration to say that ten thousand could have been taken with little difficulty, and the gregarious cocoons of its parasite were striking objects in the brilliant sunlight, strongly resembling, superficially, nests of spiders' eggs. Although in nearly all parts of the field there was very strong evidence of larval depredations, the only other larvæ I observed were a few examples of *Hadena oleracea.* I have omitted to mention that my friend saw a boy collecting *H. pisi* at tenpence per thousand, and a man was also observed with a pail which he was using for the same purpose. I have never seen before such strong evidence of the voracity of lepidopterous larvæ; it therefore was a new experience, and a sight not easily to be forgotten by an entomologist.—Alfred T. Mitchell; 5, Clayton Terrace, Gunnersbury, W., Oct. 21st, 1898.

Boarmia rhomboidaria double-brooded.—A small female of the above species was taken in Richmond Park at the end of last month. By its size and condition it is probably an example of a second brood.—Alfred T. Mitchell; 5, Clayton Terrace, Gunnersbury, W., Oct. 21st.

Plusia moneta in Surrey.—I may mention that early in the summer larva of *P. moneta* were again found in the same garden from which the species has been recorded in previous years.—(Rev.) J. E. Tarbat; Holmlea, Weybridge.

Errata.—P. 235, line 11, for "dominal" read "dominant"; p. 244, line 4, for "*Stilbia anomala*" read "*Caradrina ambigua*"; p. 257, for "Notes on Lepidoptera in 1897" read "in 1898"; p. 258, line 6 from top, for "*E. frequentella* (common)" read "*Coleophora lutipennella.*"

SOCIETIES.

Entomological Society of London.—*October 5th*, 1898.—Mr. R. Trimen, F.R.S., President, in the chair. Mr. T. B. Fletcher, of H.M.S. 'Centurion,' China Station; Mr. Claude Fuller, of the Department of Agriculture, Cape Town; Mr. Alexander Greenshields, of 38, Blenheim Gardens, Willesden, N.W.; and Mr. Oliver J. Janson, of Cestria, Claremont Road, Highgate, N., were elected Fellows; and Mr. John W. Downing, of 45, Trevelyan Road, Tooting Graveney, S.W., was re-elected a Fellow of the Society. The President announced, with deep regret, the deaths of Mr. Osbert Salvin, F.R.S., a member of the Council, and of Dr. E. Candèze, a Fellow of the Society, which had taken place since the previous meeting. The President also announced that the late Mrs. Stainton had bequeathed to the Society such entomological works from her husband's library as were not already in its possession. This bequest was of great importance, and would add to the Library a large number of works, many of which, formerly in the library of J. F. Stephens, were old and now scarce. Among the more important additions were copies of Clerck's 'Icones Insectorum rariorum'; Say's 'American Entomology' (1817), a work of extreme rarity; Goeze's 'Entomologische Beyträge,' complete; Donovan's 'Insects of New Holland'; Linnæus's 'Systema Naturæ,' ed. x.; Godart and Duponchel's 'Lépidoptères de France'; Harris's 'The Aurelian,' ed. i.; and Sepp's 'Nederlandsche Insecten.' There were also numerous modern works dealing with the lepidopterous fauna of Europe. Mr. J. J. Walker exhibited a black form of *Clytus mysticus*, L. (var. *hieroglyphicus*), taken by Mr. Newstead at Chester, where about one per cent. of the specimens were of that variety; also a black variety of *Leiopus nebulosus*, L., from the New Forest. Mr. Tutt exhibited an example of *Euchloë cardamines* irregularly suffused with black markings, and a series of local varieties of Lepidoptera from Wigtonshire. Mr. S. Image exhibited a specimen of *Acidalia herbariata*, taken in Southampton Row. Prof. Poulton showed and made remarks on specimens of *Precis octavia-natalensis* and *Precis sesamus*. These strikingly dissimilar insects had been shown by Mr. G. A. K. Marshall to be of seasonal forms of the same species; from two eggs laid by a female of the first mentioned (summer) form he had bred one imago resembling the parent, and one which was of the blue *sesamus* form. On behalf of Dr. Knaggs, Mr. South exhibited a series of *Dicrorampha*, the synonymy of which was discussed by him and Mr. Barrett, *D. flavidorsana*, Knaggs, being shown to be a good species. Mr. Barrett exhibited and made remarks on specimens of *Lozopera beatricella*, Wals., from Folkstone, and the allied species. Mr. Porritt showed examples of *Arctia lubricipeda*, obtained by continued selection of the parents, and probably the darkest ever bred in this country. Mr. Adkin exhibited a long series of *Tæniocampa gothica*, to show the results of breeding by continued selection, and some remarkable forms of *Abraxas grossulariata* from Pitcaple. Mr. F. Merrifield read a paper, illustrated by a large number of specimens, on "The colouring of Pupæ of *P. machaon* and *P. napi* caused by exposing the pupæ to coloured surroundings." The pupæ of both species were found to be modified by the surroundings of the larvæ, the effect being extremely marked in the case of *P. napi*. When the larvæ of the latter species were kept in a cage half orange-coloured and half black, all but four of the pupæ on the roof of the orange-coloured side were green with very little dark spotting, and all the pupæ on the roof of the black side were bone-coloured with numerous dark-brown spots. He regarded the phenomenon as protective. The exhibit was discussed by Prof. Poulton, who showed a similar series of specimens, and observed that he found the rays near the D line of the spectrum had the greatest influence upon the incipient pupæ, the effect diminishing towards either the red or the violet ends. The effect therefore appeared to be one of luminosity. Mr. Bateson stated that his own experience fully confirmed Mr. Merrifield's results, but to establish that the green colouration of the pupæ was protective in the winter brood required the consideration of a number of points, so far untouched. Mr. G. H. Verrall read a paper on "Syrphidæ collected by Colonel Yerbury at Aden," the specimens, together with some rare British Diptera, being exhibited by Col. Yerbury. Papers were communicated by Mr. G. C. Champion on "The Clavicorn Coleoptera of St. Vincent, Grenada, and the Grenadines," based on the determinations of M. Grouvelle, and by the Rev. T. A. Marshall on "The British Braconidæ, Part VIII."—W. F. H. Blandford, *Hon. Sec.*

South London Entomological and Natural History Society.—*Sept.* 22*nd*.—Mr. J. W. Tutt, F.E.S., President, in the chair. Mr. R. Adkin exhibited a short series of *Dianthœcia nana* (*conspersa*) from Shetland, and read notes on the variation. He also exhibited, on behalf of Mr. Reid, of Pitcaple, a long series of *Tæniocampa gothica*, the result of breeding from selected parents through some four generations, and read notes on the variation; a very distinct form of variation of *Abraxas grossulariata*, in which the black markings were absent from the central areas of all the wings, the discoidal marks only being present; a series of *Melanthia bicolorata* var. *plumbeolata;* and very fine examples of *Pachnobia hyberborea* (*alpina*) from Perthshire. Mr. Lucas, specimens of five of the less common species of British dragonflies, viz.:—*Sympetrum sanguineum* and *Libellula fulva*, from Sandwich, Kent; *S. flaveolum* and *Æschna mixta*, from Ockham Common; and *Agrion mercuriale*, from the New Forest. Mr. Tutt, a large number of *Zonosoma annulata* (*omicronaria*), bred by Dr. Riding from selected parents, to show the hereditary nature of the absence of the annulus. Some seventy-five per cent. of the imagines bred were without the annulus on the fore wings. The President, for Mr. Thornhill, a curiously-marked specimen of *Euchloë cardamines* from Cambs, having two wings curiously clouded with black; and for Mr. Manger, a box of insects of all orders, captured at sea, among which were *Deilephila livornica*, *Chœrocampa celerio*, *Macroglossa stellatarum*, *Patula macrops*, *Abraxa perampla*, and *Acridium peregrinum*. Mr. Dolman, a wonderful specimen of *Abraxas grossulariata*, taken on a tree-trunk by a boy, in which the black markings were normal, but having the ground colour of a uniform deep orange; and ova of *Aporia cratægi*, from Dover. Mr. Hall, several specimens of an ant found in the burrows of *Sesia sphegiformis*. Mr. West, of Greenwich, bred specimens of the Hemiptera, *Podisus luridus* and *Goniocerus venator*, both from Box Hill. Mr. Turner, a bred series of *Porthesia chrysorrhœa* from North Kent larvæ; a larva of *Dicranura bifida*. Mr. Dennis, the ova of *Thecla w-album* under the microscope.—Hy. J. Turner, *Hon. Report Sec.*

Birmingham Entomological Society.—*September* 19*th*, 1898.—Mr. G. T. Bethune Baker in the chair. Mr. R. C. Bradley showed *Brachypalpus bimaculatus* from Sutton, one female, taken on July 3rd this year. He said that the species was exceedingly rare, almost the only other captures he knew of being two males taken in Sherwood Forest in 1892, by himself and Mr. C. J. Wainwright. Mr. A. H. Martineau, *Ammophila sabulosa*, bred from a pupa found in the New Forest last June; also *Spilomena troglodytes* and *Stigmus solstagi* from Solihull, both of which, he said, were amongst the smallest species of our British Aculeates. Mr. W. Wynn, *Cosmia affinis*, *Numeria pulveraria*, *Cidaria ribesiaria Eubolia cervinaria*, and a long, bred, and very beautiful series of *Triphæna fimbria*, all from Hampton in Arden; also a long, bred series of *Cucullia verbasci* from Wyre Forest, and a single specimen of *Acidalia straminata* from Wyre Forest, the latter being a new record. Mr. H. Willoughby Ellis, a series of beetles from Cannock Chase, including *Orchesi micans*, *Miscodea arctica*, and many others. Mr. G. T. Bethune-Baker, two drawers from his collection, containing the genera *Neptis*, *Junonia*, and *Limenitis*.

The meetings of this Society will be held for the future at the Norwich Union Chambers, Congreve Street, Birmingham. They are held on the third Monday in each month, and entomologists are cordially invited to be present.—Colbran J. Wainwright, *Hon. Sec.*

Kendal Entomological Society. — *October* 10*th*, 1898. — The President in the chair. There was a good attendance, and three new members were elected. The room is now excellently lighted with incandescent gas-lights, and is altogether very comfortable and satisfactory for meeting purposes. A paper on "September Collecting in the Lake District" was read by the President, dealing chiefly with the search for *Cidaria reticulata* and *Cucullia asteris;* the former of which has apparently vanished, and the latter, in the larval stage, has turned up in considerable number on the golden-rod (*Solidago virgaurea*). *Vide* article on *C. asteris*, by Rev. A. M. Moss, *ante* p. 264. Mr. Moss then reverted to the former insect, and gave the life-history of, and his experiences with *C. reticulata*. The first note-book for the records of local butterflies is now in process of compilation, and was shown to the members present. The exhibits, produced by Messrs. Doherty, Graveson, Holmes, Littlewood, Moss, Smith, and Wright, as usual, embraced many points of interest, and showed some good captures. As many as five or six specimens of *Sirex gigas* have been caught in the neighbourhood this year, and there seems good reason to believe that it has become established. Sugar has been yielding pretty plentifully lately, and the results embraced the following:—*Phlogophora meticulosa* and *Xanthia ferruginea* (both abundant), *X. silago*, *X. cerago*, *Cerastis vaccinii*. *C. spadicea*, *Scopelosoma satellitia*, *Anchocelis rufina C. litura*, *Epunda nigra*, *Miselia oxyacanthæ*, one *Agrotis saucia*, and about nine *Calocampa exoleta*. The Secretary begs leave to modify the description of variety of *Epinephele ianira*, recorded in September. The specimen is not like Newman's figure, and differs chiefly from the type by having the yellow patch replaced by almost pure white. He apologizes for error.—A. M. Moss, *Sec.*

RECENT LITERATURE.

Insects: Foes and Friends. By W. Egmont Kirby, M.D. Preface by W. F. Kirby, F.L.S., F.E.S. 12mo. Pp. 138. With thirty-two plates printed in colours. London: S. W. Partridge & Co. 1898.

As an elementary introduction to the study of Economic Entomology, this little volume is not without value. It has been translated and adapted from a book which we are told in the preface "has had a large sale in Germany." The plates are superior to some that we have seen in works offered to the public at a very much higher price; and the text is in no way less trustworthy than that of the more scientific manuals.

Insect Lives as told by Themselves. By Edward Simpson. Small 8vo. Pp. 128. With twenty-three illustrations. London: The Religious Tract Society. (No date.)

In the course of a series of some nineteen chapters, the author introduces several more or less familiar insects, and gives an account of the life-history and other particulars connected with each one as he is supposed to have ascertained them by an "interview" with the creature itself. Although perhaps not exactly new, this style of treatment is well chosen, as it is more likely to arrest the attention of the general reader than would expression of the same facts in the orthodox language of the naturalist. We gladly welcome every work having for its object the popularising of the study of Entomology, and we believe that the book under notice will have influence in this direction. The price is merely nominal.

Economic Entomology.

The Journal of the South Eastern Agricultural College, Wye, Kent. Pp. 58. Illustrated. London: Headley Brothers. August, 1898.

Contains articles by Mr. Fred. V. Theobald on insects that are injurious to fruit and forest trees. The same observer points out that "grease-banding" is of little use as a preventive against the attack of the "winter moth," *Cheimatobia brumata*, as the females of this species "are carried *in copulâ* by the males up into the trees."

The following publications, by the U.S. Department of Agriculture, Division of Entomology, have been received:—

The San Jose Scale in 1896–1897. By L. O. Howard. Bulletin, No. 12. New Series, pp. 30. Washington, 1898.

The Periodical Cicada: an Account of Cicada septendecim, its Natural Enemies, and the means of preventing its Injury; with a Summary of the Distribution of the Different Broods. By C. L. Marlatt. Bulletin, No. 14. New Series, pp. 148. With frontispiece, three plates, and figures in the text. Washington, 1898.

Bibliography of the more Important Contributions to American Economic Entomology. Part VI. The more important writings published between June 30th, 1888, and December 30th, 1896. By Nathan Banks. Pp. 273. Washington, 1898.

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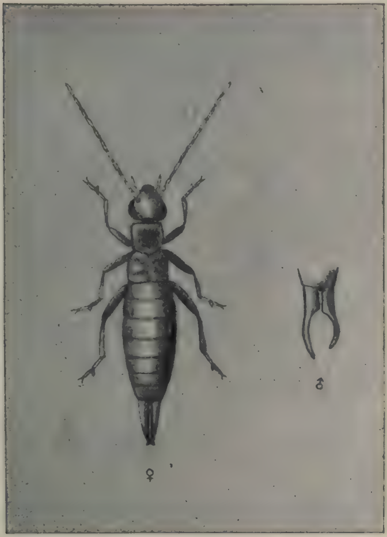
FORFICULA LESNEI, Finot.

By W. J. Lucas, B.A., F.E.S.



In an early number of the present volume of the 'Entomologist' (*ante*, p. 49), I recorded and figured a male of what was then considered a rare British earwig, *Forficula lesnei*, which had been captured near Reigate by Mr. W. West, of Greenwich. During the past season (1898), while searching more especially for Hemiptera, the same indefatigable collector was on the alert for *F. lesnei*, and his efforts were crowned with unlooked-for success. He tells me that on Sept. 1st, while beating birch in the neighbourhood of Leatherhead, he took two males. On the 3rd of the same month, at Reigate, using the sweeping-net from 10 a.m till 3 p.m. for Hemiptera, he swept every patch of *Ononis* he could find, but not an earwig came to the net. But when beating whitethorn, hazel, &c., *F. lesnei* tumbled into the umbrella quite commonly. There were full-grown males and females, as well as immature specimens. The mature males were more common than the females in the same state. From Mr. West's experience last season no collector of the Forficularia ought to be without *F. lesnei* in his collection, but he must use the umbrella, and not sweep *Ononis* as suggested in my previous note.

In connection with the same insect, Mr. W. J. Ashdown tells me that this earwig has occurred in many places near Leatherhead during September and October, and in some localities appears to replace *F. auricularia.* He takes them in the sweeping-net, and by beating old hedges, and does not find that they are attached to any one plant or shrub in particular. Mr. Ashdown calls attention to the fact that in many of the males the apices of the forceps are not gaping but contiguous, so that this fails as a method of distinguishing the species. The proportionate length of the dilated part also varies, and small specimens have the forceps more elongate, though none of them resemble the figure of *F. pubescens* that Mr. Burr gave in the Ent. Mo. Mag. 1897, p. 148. The antennæ of *F. lesnei* are stated to have twelve joints, and those of *F. pubescens* thirteen; but this is not of much use for purposes of identification, as earwigs are frequently found with their antennæ a few joints short, perhaps due to their occasionally carnivorous habits.

The figures represent a mature female, and the forceps of a male with the left branch deformed, which, through the kindness of Mr. West, I have been able to add to my collection. Both are magnified three diameters.

November, 1898.

A FEW NOTES ON *ACIDALIA HUMILIATA*, Hufn.

By P. W. Abbott.

Through the kindness of my friend Mr. A. J. Hodges, I received, on June 29th last, eighteen ova which had been deposited on the 26th and 27th of that month by a captive female taken by him in the Isle of Wight. I am also indebted to my friend Mr. L. B. Prout, F.E.S., for reference to and copious extracts from Sepp and from Millière, from the former of whom

I quote the following descriptions for comparison with the results of my observation of the various stages of the ovum and larva as far as they have yet progressed:—

Acidalia osseata, W. V. (=*humiliata*, Hufn.), Sepp's 'Nederlandische Insekten,' 2nd series, vol. iv. pp. 50, *et seq*.

The writer captured a fertile female in July, 1877, upon the dunes at Overveen, which laid six ova on July 13th, of which five hatched on July 23rd.

"Eggs light red, covered with network of regular cells, somewhat more greyish and with smaller cells than those of *dilutaria*. . . . When first hatched the larvæ were dark grey, with black heads and a short hair on each segment, . . . but soon became lighter in colour, and towards the first moult pale red-brown; much less slender than most *Acidalia* larvæ, and hence cannot roll up in the peculiar spiral form taken by many of the genus. First moult Aug. 2nd–4th, second moult end of August and beginning of September. They continued active and feeding until the end of September, yet always fed slowly and sparingly. . . . The larva becomes after the first moult somewhat lighter coloured than originally, yet still almost markingless. The markings and colour of the full-grown larva do not appear until after the second moult, and are most distinct shortly after the third moult. Skin is very rough, entirely covered with wart-like spots, with several short thick hairs on head, prolegs, prothorax, and anus; one only (equally short) on each middle segment, thickened (club-shape) at the tip."

In the above extracts I have only quoted as far as the third moult, reserving the remainder of Sepp's very full description until the larvæ under my observation have successfully attained their full growth, as it renders comparison with my own observations more easy.

I am of opinion that the egg is not attached to the food-plant, but is laid in a manner similar to those of the Hepialids, in which Mr. Hodges confirms me from his previous experience of the species in its wild state, which extends over several seasons past. The keenest observation that I have been able to bring to bear upon this interesting species, in this the first attempt to rear it in captivity, has failed to detect up to the present stage any material discrepancy or inaccuracy in the exhaustive description by the well-known continental authority from whom I have quoted above, with the exception of the dates of the early moults and a few minor details. These are probably due to the hereditary effects of climatic influence and isolation in the solitary colony which, as far as has been found at present, constitutes the only foothold of the species in England.

The ova which I had under observation were apple-shaped, of a light brick-red, reticulated with small and uniformly symmetrical shallow cells, growing darker until the larvæ emerged, from July 6th to 8th. They soon became lighter in colour, and towards the first moult became light reddish brown, as described above; and in this particular I am glad to be able to confirm Sepp's description, as Millière states that the colour in this stage is "white inclining to greenish," which I do not find to be the case.

With regard to the position assumed by the larva when disturbed from its food-plant, I find it most nearly to resemble a broad U-shape, which appears, from the general habits of this very sluggish larva, to be merely the result of lethargy.

With regard to the dates of the first and second moult, my observations correspond within a few days with those quoted above; but some of the larvæ under my care appear to have made their third moult before the end of September, and upon which the markings more nearly assimilate to those of the full-grown larva. They all appear to be most erratic feeders, a few warm days causing them to be quite lively and to feed well; whilst a short spell of cold weather had the effect of making them sit on their food-plant as though they were going into hybernation at once.

A striking feature in the larva, in its third skin, is the "fish-scale form" pattern, which is most distinct on segment 8, and which is noted by Sepp, whose description I will quote further when I have completed my observations of the later stages of this most interesting larva, should I be fortunate enough to get them safely through hybernation. At present they appear to be healthy, and I have every hope that I shall be able to complete my observations of the entire life-history.

I was in the Isle of Wight with Mr. Hodges this year during June, and in company with him I made my first acquaintance with the species in its somewhat inaccessible locality. I spent about three hours at the most tiring collecting that I ever remember to have experienced, owing to the roughness of the ground. However, as I was successful in obtaining five specimens, mostly in very fine condition, I felt amply repaid for my exertions. I did not, however, succeed in getting any females, but subsequent comparison in a series captured by Mr. Hodges shows them to be much smaller than the males, and with narrow pointed wings, whereas the males have fuller, broader, and rounded wings.

Sutton Coldfield.

THE SUMMER SEASON OF 1898.

By Albert J. Hodges.

I have noticed, since my return from active collecting this season, a great sparseness of "records" of interesting species of Lepidoptera: whether this arises from the absence of good species in general, or from fear of the "Extermination Committee's" wrath, I know not; but it is regrettable, from whatever cause arising.

I did not emerge from my "hybernation" until June, and even then it almost needed to build a fire under me before I could be got to work; and I think but for the persevering energies of Mr. P. W. Abbott in stimulating my ardour with prospects of enjoyable trips that I should have let the season pass. However, June 6th saw me well under way to Wicken, in company with Mr. J. P. Mutch, where by arrangement we met Mr. Abbott, thus completing our trio. The abnormal cold nights of that month are a matter of history, and we certainly found the midnight temperature approaching arctic severity. Our first few nights resulted in nothing beyond *Apamea unanimis*, and single specimens of *Meliana flammea*, *Arsilonche venosa*, &c.; but, nothing daunted, the well-known "Eddystone" shed its radiance nightly, and, as usual, perseverance had its reward. The "little favourite" of the fen evidently dislikes the "madding crowd" of common moths, for its appearances were reserved for nights when there was hardly an insect on the wing. Upon one occasion, during the whole night from 10 p.m. to dawn, only five moths came to the light, of which two were *Hydrilla palustris*. Between June 11th and 17th (when we left) our trio captured twenty-one specimens, including one black variety, which fell to the lot of Mr. Abbott. Our greatest take in one evening was eight, which I trust is a "record." There were on some evenings no less than seven lamps at work besides our own, and, as I can only account for a total take of about forty specimens, I think the "Eddystone's" share of twenty-one a very good percentage. By day we found the usual numbers of *Bankia argentula* at Chippenham, where I also understand that larvæ of *Plusia chryson* were in fair plenty. We were too early for Tuddenham, but found *Lithostege griseata* in some numbers.

A fortnight of fen work being, in our opinion, ample for anyone at a time, we packed up, and went to Freshwater, arriving there on June 18th, losing no time, but spending the same evening on the nearest approach we could find to fens, namely, a tidal estuary, odoriferous and moist. A long series of *Acidalia emutaria* rewarded us, but sugar was useless in the woods. Its attractiveness, however, improved during the next fortnight or so, culminating towards the middle of July, when I got a fine and long series of *Agrotis lunigera*, *A. corticea*, *A. lucernea*, *Hadena dentina*, &c., upon the Downs. Earlier in the month I found the more sheltered spots at the foot of the Downs more remunerative, and from the last week of June to about July 2nd various species of Noctuæ were attracted in considerable numbers, amongst which the best were *Neuria saponariæ* (*reticulata*) in unusual plenty, *A. putris*, *Caradrina morpheus*, with two only perfectly fresh *Triphæna subsequa* (*orbona*, Hufn.). During this period the top of the Downs was occasionally worked, but the usual species appeared to be unusually late; and at the date when *A. lunigera* should have been fully out, I only succeeded in finding *A. cinerea*, five specimens being taken at the same time off one clump of thistles. *Setina irrorella* was in abnormal abundance, and I took a long and fine series by searching during the day, but, however, as usual, failed to find the "IVI variety."

My friend Mr. P. W. Abbott was very anxious to make acquaintance with *Acidalia humiliata*, and visited the spot where they occur, in company with me, during the last week in June, succeeding in capturing about half a dozen specimens; but he was disappointed in not obtaining a female. In this I was fortunately more successful, and, having induced her to lay, I sent the ova to him, and have recently had the pleasure of seeing the larvæ, and of comparing them with the continental authorities. I am much amused at the wild and frantic efforts made by many of our most energetic "collectors" (I mean *sale-room* collectors) to try and persuade both themselves and their friends that this unwelcome little stranger has no rights of entry to their cabinet, and I would not like to be unkind enough to suggest that it is because in spacing out their columns there is no "blank" left for it. Another cogent reason is that it does not appear in "Newman," and in cutting up their label-list no mystic printed slip is found for it. Rather let us fill our cabinets with dead and gone species like *Polyommatus dispar* and *Lælia cœnosa*, or artificially preserved ones as *Ocneria dispar*, than find room for an addition to our existing species. I am, however, wandering from my subject, as I did from my own pet locality when I made my first trip for *real* British *Melitæa cinxia*. Although working the Isle of Wight for years past, I never worked for that species until this season, and I think that my efforts in that direction will not call down upon me "anathema maranatha" from the irresponsible arbiters of permissive field-work, as only three specimens were taken. It was, however, a satisfaction to visit the locality, which I am afraid had been previously drawn upon, or there would surely have been abundance of worn specimens on the wing, especially as I was very late. I have had a very wide experience of this species in Guernsey and Sark, and would beg all entomologists to be sparing in their captures of the larvæ, or it will soon be added to the list of extinct species. In my opinion this is one of the (if not *the*) only species of Macro-Lepidoptera which needs "protection," especially in its gregarious larval stage.

Amongst Geometræ, *Anticlea rubidata* was in swarms, it being easy to net three or four at a time, mostly fine. I succeeded in obtaining ova also of this species for my friend Mr. Abbott. After a long experience of collecting at Freshwater, my notes of the 1898 season show an abnormal abundance (comparatively) of *A. cinerea*, *S. irrorella*, *A. rubidata*, *N. saponariæ*, *A. putris*, *M. anceps*, and *A. corticea*, with a scarcity of *A. lucernea*.

On July 25th I started for South Devon, a cross-country route taking up nearly the whole day. The heat was abnormal, and tourists objectionally plentiful *en route*, entomological paraphernalia being quite out-classed by cameras and bicycles. I arrived at my destination weary and dry, but fortunately in time for the ever-ready treacle-pot and net. Casual search during a long walk to my collecting ground revealed a few larvæ of *Heliothis peltigera* feeding on small plants of *Hyoscyamus niger*; time did not allow of a careful search, which was postponed till the morrow. Dusk revealed the fact that *Lithosia caniola* was scarcer than usual, which is not surprising, seeing that it straggled out until early September, when I took my last fine female. Sugar also proved very little use, and consequently *Leucania putrescens* has remained a scarcity in my store-boxes this season. Persevering work every night, good or bad weather, brought together, however, a few of each species, but in spite of all our efforts the great success of the previous season was not repeated, *Laphygma exigua* and *Leucania albipuncta* neither rewarding our most zealous efforts during August. *Caradrina ambigua* occurred singly upon the very same date of its first appearance in 1897 (about Aug. 5th), but did not come at all freely until a fortnight or so later. Our first success was Aug. 23rd, when a good *H. armigera* was taken at 11.30 p.m. at sugared flowers of *Knautia arvensis*, a second and very worn one being captured Sept. 13th. On Aug. 27th sugar suddenly became very attractive, the weather having broken utterly, and cold driving showers falling all day, until 4 p.m., when the sun broke through. The evening was bitterly cold, and the herbage soaking, completely wetting one through and chilling to the marrow. Noctuæ evidently, like water companies, were tired of the drought, and simply swarmed, *Phlogophora meticulosa*, *Noctua xanthographa*, *P. gamma* in excess; but I think I counted up to twenty-six or twenty-seven different species of Noctuæ, although the late autumn species had not shown up at all, even *Xanthia circellaris* not coming until Sept. 12th. So excited were the dissipated crowd that I found *Noctua c-nigrum* in cop. with *N. xanthographa*. However, my principal capture was *Leucania vitellina*, of which

I took one about 9.15, and a second at 10.15, both feeding freely under a coldly brilliant moon and an absolutely cloudless sky, with a cold high south-west wind. My success was subsequently repeated, single specimens falling to my boxes on Aug. 29th, 30th, 31st, and Sept. 2nd, 3rd, and 7th, of which five are absolutely perfect, and all are good. What appear to me to be the females are larger and more fulvous than the males, with dark wing-rays on the hind wings; whilst the others are a paler straw-colour, with less distinct markings. The weather was bad during the days of the first three captures, usually blowing a gale; in one case I took the specimen in broad daylight, before thinking of lighting up at all.

Agrotis saucia was very plentiful and in lovely condition, *A. obelisca* sparing, and only single specimens of *Heliothis peltigera* and *Plusia festucæ* came to the sugar. After the gale had blown itself out, we had a series of still cold damp nights, when only *N. xanthographa* remained faithful; but geometers then took up the running, a second brood of *Larentia pectinitaria* appearing, amongst which I took varieties with the dark band more or less obsolete. On Sept. 1st a fine fresh male *Camptogramma fluviata* visited my heads of *Eupatorium cannabinum*, and was promptly secured; this was a valuable item, as it put me on the alert, and I looked out well for this little rarity, until Sept. 7th, when at supper at my diggings, about 10.45 p.m., a fine fresh female flew in to the lamp, and was cyanided *pro tem.* and examined. On reviving she obligingly laid sixty-four eggs, which proved fertile, to my great surprise, as the female appeared absolutely fresh. These larvæ nearly came to a sad end, as they were preceded by a voracious brood of *Lithosia caniola* larvæ which hatched from ova laid previously in the same chip-box. However, my friend Mr. Abbott (to whom I entrusted the ova) proved equal to the occasion, and remorselessly settled these ferocious-looking little "cuckoos" ere they could do harm. At the time of writing (Nov. 2nd) we have a dozen of these same *C. fluviata* on the setting-boards, all males unfortunately.

My run of luck was not yet over, as on Sept. 10th I took another fertile female at sugar, which laid about two dozen eggs. These I sent to my friend Mr. A. W. Mera, who has also been successful in getting them through A last specimen was secured Sept. 13th, but was a fine male; on the same evening I also took the second *H. armigera* (previously referred to), and a very worn *L. exigua*, which I kept on the off-chance for eggs. As I was leaving next day I brought it up alive, but it died without laying, and examination inclines to the opinion that, as with the worn one I kept in 1897, it was a male. Better luck next time; but altogether I have no reason to join in the general wail of 1898 as a bad season.

Colias edusa occurred very sparingly, and seemed to pass over on one day, and disappeared almost completely; *Vanessa cardui* was very common; also *V. io*, *V. atalanta*, &c.

I have not met with any exceptional good fortune in the way of varieties during the season, but during early July I renewed my acquaintance with the confluent form of *Zygæna trifolii* at Freshwater, and obtained very fine extreme forms. With the erratic species *Z. filipendulæ* I had better success, meeting with a small but numerous colony about Aug. 2nd in South Devon. I worked it steadily for over a month, and obtained five of the yellow variety, three of which, in fine condition, showed a very rich colour, contrasting beautifully with the metallic green, and altogether a handsomer variety than I had obtained some years before in the Isle of Wight.

After my return to London, on Sept. 14th, I crossed to Guernsey for a short business visit, during which I found *Sphinx convolvuli* in great abundance, six or eight being seen together at one small bed of *Nicotiana affinis*. Although quite without apparatus, I could not resist the temptation of catching a few, thus finishing my active season's collecting.

TWO SEASONS AMONG THE BUTTERFLIES OF HUNGARY AND AUSTRIA.

By Margaret E. Fountaine, F.E.S.

Having spent the greater part of two successive summers in one or other of these two countries, I think perhaps a few remarks on the principal Rhopalocera belonging to them would not be otherwise than useful and interesting to the readers of the 'Entomologist.' Last year I was in Austria during the first three weeks in May, making Vienna my head-quarters, as Dr. Staudinger had recommended that neighbourhood to me before any other. Here I was fortunate in making the acquaintance of Baron Adolf Von Kalchberg, of Hietzing, who most kindly wrote out a paper for me, giving the localities for all butterflies of any importance to be taken in that neighbourhood. However, the spring of last year was so cold and wet, that I did very little collecting till I returned to Vienna at the end of June, leaving again on July 12th for Herkulesbad, a charming Hungarian watering-place in the Mehadia district, where I found several very interesting species; but being too late to secure fresh specimens of all I saw, on Aug. 7th I left, resolving to return this year, and went back to Vienna, in which vicinity I remained more or less till the end of the month. This summer I visited Hungary only, arriving at Buda-Pest in the end of May. Here I became acquainted with a number of Hungarian entomologists, from whom I received the greatest kindness and assistance. They invited me to attend their meeting every Friday evening (of which Dr. Uhryk Nándor was the president), where they discussed entomology in all its various branches; also arranged expeditions for the ensuing week, in most of which I accompanied them, till about the middle of June, when I again found myself at Herkulesbad till the end of July, when I returned to Buda-Pest till the middle of August, stopping a few days at Kavaran-Szakul on my way back, a village passed on the line south of Temesvar. I will now proceed to describe the results of my collecting.

Papilio podalirius var. *zanclæus*, Z.—This variety is taken at Buda-Pest in August, but the specimens I saw had not the abdomen so entirely white as those of Sicily.

Thais polyxena, S.V.—Occurs commonly round Buda-Pest, but I was too late for it; however, I secured a good number of larvæ from Adlersberg in June, feeding on *Aristolochia*, of which, out of about two dozen, eighteen pupated, and are now in my possession.

Parnassius mnemosyne, L.—Common, but rather worn, on June 5th, in the forest of Szaár, about seventy kilometres from Buda-Pest.

Pieris napi var. *flavescens*, Stgr.—This is an exceedingly interesting variety, occurring, as far as I could make out, *only* at Mödling, near Vienna.—The spring brood was nothing but a rather pale edition of var. *bryoniæ*, O., but in July I took some very remarkable female specimens, in which the ground colour was more or less of a rich ochre tint throughout, with the black markings much exaggerated (and very black, not dusky as in *bryoniæ*), but I took one specimen in which these markings were the same as in the type, though the ochre tint was especially brilliant. The males were all typical.

Colias chrysotheme, Esp.—I made an expedition to Mödling with the Baron von Kalchberg in May last year, hoping to secure this species, but we did not see one. He informed me that it was always much scarcer in the spring brood, and the specimens were smaller and paler. At the end of August I found it common enough in the same locality. It also appears in the neighbourhood of Buda-Pest, larger and finer than the Austrian form, but I was unfortunate in not obtaining one specimen, though Herr Aigner caught three or four on Aug. 7th, in the Kammerwald, one female of which was very large and strongly marked.

C. myrmidone, Esp. — This most charming butterfly occurs in various localities near Buda-Pest. Unlike *C. chrysotheme*, the specimens of the first brood seemed to be the largest and brightest, but the second brood was more abundant. I took it at Csepel-Sziget, Hidèg Volgy, and Farkas Volgy. It was a curious fact that in Mehadia I I saw no *Colias* except the two common ones, *hyale* and *edusa*.

Thecla betulæ, L., *T. spini*, Schiff., *T. w-album*, Kn., *T. acaciæ*, F., *T. quercus*, L. (also var. *bellus*, Gerh., but rarely) and *T. rubi*, L.—All occur in the mountains above Ofen, the local name for Buda.

Polyommatus virgaureæ, L.—A remarkably fine form occurred in the Wasserwald, bei Mehadia, in June.

P. thersamon, Esp.—Fairly common on the marsh ground below the Kammerwald, and other localities in the neighbourhood of Buda-Pest, in August, but some of the specimens were rather worn. I also took it near Kavaran Szakul, at the end of July, where it was much more worn; possibly the end of the first brood (?).

P. dispar var. *rutilus*, Wernb.—A very small form of this butterfly was common round Kavaran Szakul at the end of July; near the Kammerwald, in August, most of the specimens were much larger. I also took one male in the forest of Szaàr, in June.

P. alciphron, Rott.—At Isaszegh, about fifty kilometres from Buda-Pest, on June 2nd, in one particular spot on the borders of a wood, I took several very fine male specimens in perfect condition, and a week later, at the same place, the females were also out, but much rarer. This butterfly also occurs in the Cserna Thal, near Herkulesbad, but it was practically over by the time I got there, both this year and last.

Lycæna amanda, Schn.—I took two males on June 14th, at Szép-Juhászué, near Buda-Pest, and Herr Aigner took several others, also males. I did not see a female.

L. meleager, Esp.—This most beautiful butterfly occurs more or less commonly in every locality I visited in Hungary and Austria; the females, however, are rare. The whole of the month of July is its time of appearance, and good specimens are still to be met with in August.

L. iolas, O.—This "monster blue" occurs abundantly in Farkas Völgy the last fortnight in July; but when I was there in August it was quite over; I only saw a few specimens, and they were too much worn to be worth taking. It looks as large as *M. galatea* when on the wing. The larva is to be found in the seed-vessels of *Colutea arborescens*.

L. arion, L.—In Mehadia this is one of the commonest of the "blues"; I also found it at Kavaran-Szakul, where I took one specimen of the var. *obscura*, Frey, but it was not so dark as the Swiss form. I may here add that all the commoner species of this and the preceding genus, such as *P. dorilis* and *phlæas*, *L. icarus*, *damon*, *orion*. *argiolus*, *corydon*, &c., also occur throughout Hungary with the usual prolific abundance.

Libythea celtis, Esp.—This is a butterfly that seems to have a very wide range, but never to occur in any abundance. Out of the four specimens I have in my collection, one is from Granada, in Spain; one from Aix-en-Provence, in France; one from Sondrio, in North Italy; and one I took last year at Herkulesbad,—the only one I ever saw there.

Apatura iris, L., *A. ilia*, S.V., and var. *clytie*, S.V.—Any entomologist desirous of seeing the *Apatura* reigning supreme must visit the Rohrwald, near Spillern, about twenty kilometres from Vienna, the first fortnight in July. I shall never forget what a sight it was; the pathways through that magnificent forest were literally swarming with butterflies of this genus, *clytie* being by far the most numerous, while the typical *ilia* was comparatively rare. Upon making enquiries of a local entomologist I chanced to meet, he assured me that this profusion of insect life occurred invariably the same at this season of the year, which seemed all the more remarkable, as the depredations made upon such large conspicuous butterflies were incessant; every peasant-boy was armed with a net of some sort, and I actually saw one lad with his hat decorated lavishly and wastefully with as many of these glorious insects as, with folded wings, he was able to cram together; that boy alone must at least have secured some thirty specimens. I could only suppose that the reason extermination does not result from such wanton sacrifice was owing to the fact that all these swarms were entirely males. I left Vienna before the females were out, and later on, early in August, upon revisiting the Rohrwald, not a single individual of all that gay throng was left; the forest-paths were quite deserted, and sadly enough did I miss the flutter of their wings and the exciting influence of their beautiful presence. The *Apatura* also occur, but much more sparingly, in the Mehadia district.

Limenitis populi, L. — Occurs, but not commonly, in various localities, in both countries. The only specimen I ever saw was in the Rohrwald, in July, and that was in the box of another collector.

L. camilla, S.V.—One fine male specimen on the Alionberg at Orsova this year, in July. I observed no others anywhere, except one female (damaged) near Herkulesbad in June.

L. sibylla, L.—Common in June and July in almost every locality I visited in either country.

Neptis lucilla, S.V.—Common in the park at Schönbrünn, near Vienna, in June, and in the forests round Herkulesbad in June and July.

N. aceris, Lepsch.—There is something very weird and sad about the flight of this graceful little butterfly, with its meteor-like movements, as it glides backwards and forwards against the dark green foliage in the forest glades, which it loves to haunt; and though often ascending far beyond the swoop of the net, it more often comes within easy reach of it, thereby falling a ready prey into the hands of the greedy collector, for, though common enough where it occurs, *aceris* is not met with in Europe except in the far East. I found the second brood emerging towards the end of July last year, near Herkulesbad, where it soon became extremely common. This year, however, individuals of the second brood began to emerge in quite the beginning of July, and were more or less worn *before* the period when I had found them fresh the year before. Is it possible that *aceris* produces three broods in the course of the summer? I did not come across it farther west than Kavaran-Szakul, were it was also extremely abundant.

Vanessa levana, L., and var. *prorsa*.—Occurs near Vienna and in some parts of Hungary, but always in my experience very sparingly.

V. polychloros, L.—In a wood near Orsova, in June, I found numbers of this insect flying round the young elm-trees and settling on their trunks, and as far as I could make out they were all exclusively *polychloros* and—nothing else!

V. xanthomelas, S.V.—I only succeeded in taking one specimen of this rare butterfly this year, in June, in the Cserna Thal, near Herkulesbad, which I had been told was a locality in which it was occasionally taken.

V. vau-album, S.V.—Also only one specimen, at Rodaun, near Vienna, on July 9th, 1897. It was flying over a manure-heap on the outskirts of a wood, and I believe I saw one or two others flying high up on oak-trees the same day. But when I again visited the locality in August all signs of it had disappeared.

Melitæa maturna, L.—Fairly common in a limited range, at one part in the forest of Szaàr, on June 5th, but several of the specimens were already rather worn, Later on, in one of the forests near Herkulesbad, I also found one or two, but these were very much the worse for wear.

M. cinxia, L.—The female specimens at Szaàr were more or less paler in the ground colour, with the black markings very broad and distinct, and a strong inclination to olive-green on the basal half of the fore wings.

M. phœbe, Kn.—Always a most variable insect; occurring in every locality I visited. In the Cserna Thal the females had the ground colour extremely pale in parts, and the black markings very broad.

M. trivia, S.V.—This year, for the first time, I became personally acquainted with this little butterfly, by no means one of the least difficult of the *Melitæa* to distinguish and classify, as it varies very considerably both in size and colour. In the forest of Szaàr, in June, I took a male of medium size, of which the ground colour in parts was very pale. At the top of a high mountain called Hunka-Kamena, on the frontier between Hungary and Roumania, I again came across *trivia*, but so sparingly that I only succeeded in netting two specimens, one of which was a female of such huge dimensions, and so darkly marked, that had I been at Sarepta, in Russia, I should have considered that I had taken the var. *fascelis*, Esp. But at Farkas-Volgy, &c., near Buda-Pest, in August, this species puzzled me yet more; some of the specimens were exceedingly small (I suppose, var. *nana*, Stgr.), the fulvous varying in tone, and many were scarcely distinguishable from *M. didyma* var. *occidentalis*, Stgr., which occurred at the same time and place.

M. didyma, O.—This is, I suppose, about the most variable of all the *Melitæa*. Near Orsova, in June, the females appeared all to be of the var. *meridionalis*, Stgr.; also occasionally at Herkulesbad, some fifteen miles away, but much less markedly so. The var. *occidentalis* occurred with the var. *alpina* at Farkas-Volgy in August, the former often being extremely difficult to distinguish from *M. trivia*, though some of the specimens were quite distinct.

M. dictynna, Esp.—Common in the forest of Szaàr in June.

M. athalia, Rott.—A large, strongly-marked variety, called *mehadiensis*, is said to occur at Mehadia, but I did not come across anything but the type.

M. aurelia, Nick.—At Peszér, near Buda-Pest, in June.

Argynnis selene, S. V.—Fairly common in June; also *euphrosyne*, L.

A. dia, L.—Common throughout Hungary and Austria.

A. daphne, S. V.—Common at Herkulesbad in June and July.

A. hecate, Esp.—In the neighbourhood of Buda-Pest in June. I did not observe it anywhere else.

A. latonia, L., *aglaia*, L., *niobe* var. *eris*, Meig., *adippe* var. *cleodoxa*, O., and *paphia*, L., are all to be found in both countries.

A. pandora, S.V.—Occurs in the Cserna Thal. I saw a few specimens, damaged, last year in July; and took one very fine male this year in June, but saw no others.

Melanargia galatea, L.—Occurs commonly in Hungary and Austria; var. *leucomelas*, Esp., occasionally with the type; and from the Domoglet, near Herkulesbad. I have some very black examples of the var. *procida*, Hbst. One female I took there last year is *procida* above and *leucomelas* beneath.

M. japygia var. *suwarovius*, Hbst.—It was to take this interesting variety that caused me to visit Buda-Pest, as I had heard on good authority that the only known locality in the whole of Hungary where it occurred was a wood at Peszér in that neighbourhood. Therefore at every Friday evening gathering of the Buda-Pest entomologists I would enquire anxiously if the *suwarovius* was yet on the wing; and, after a week or ten days, at last a day was fixed to make the great expedition to Peszér, which from all accounts appeared to be about the most inaccessible place imaginable. On the 12th of June, beneath a brilliant sky, we started in the early morning from Buda-Pest, a party of five in all, Herr Aigner acting as guide, as he alone had previously visited this wonderful spot. About two hours in a slow train brought us to Dàbàs; but there our hardships were to begin. Herr Aigner secured a cart at the station drawn by two little Hungarian horses—a sort of miniature hay wagon it seemed to me; and the first jog along the road to the village of Dàbàs was enough to show us that it was entirely innocent of springs. The way was long; and to say that the road was bad would be to give but a faint idea of the tract of country over which we travelled in our springless vehicle; the sand was so deep in many places that the wheels sank in up to the axle; but the horses seemed quite accustomed to it, and did their work well. The farther we went the worse it got; and, by and by, we left the so-called road and seemed to be pursuing a half-beaten track across the open grass land; twice the way lay through great sheets of water, in one of which we stuck in the mud, and I thought nothing could save us from being upset; but no one else seemed to think anything of it, so I concluded that this too was part of the play! We were now quite in the wilds of Hungary; at intervals we passed through immense herds of long-horned cattle; but human life seemed to be but thinly represented. I could not but admit that Herr Aigner was right when he had told me that the way from Dàbàs to Peszér would have been absolutely impracticable for a bicycle. I really began to think we should never get there; it was more than two hours since we had started from Dàbàs, and still we were bumping and jolting along, stiff and tired even before reaching the scene of action. But, whatever the hardships and risks of the way had been, they were more than compensated for when we did arrive. It was indeed an entomologist's dream realized, when we alighted, to find ourselves in a forest literally abounding with butterflies, and where the *suwarovius* was the most conspicuous of all; it was flying by hundreds—a white, graceful creature—in all the grassy glades of this wonderful forest, and nearly all in perfect condition. The females were especially beautiful, the under side of the hind wings and apex of the fore wings being broadly suffused with a deep primrose tint. Knowing that I should probably not find myself in this world-forsaken spot again, I secured all my box would hold, and only regretted that I had not brought two boxes.

Eighteen males and fifteen females were the results of my captures; and then I began to awaken to the fact that other treasures were also to be had in the woods near Peszér. *A. hecate* was flying everywhere, and in perfect condition; but it was a little early for the females, of which I only took one, a splendid specimen, very darkly marked. *M. aurelia*, *A. daphne*, *P. alciphron*, and *C. morpheus*, with many other butterflies, if common in other places, literally swarmed here; if rare in other localities, in this favoured spot they were abundant. We stayed on till late in the afternoon, and the long, glorious day was beginning to wane at last. All were satisfied, and I was delighted, with the success of the expedition. It is worth the long journey from England to Hungary, if only to pay a visit to Peszér in June, especially in the society of so many congenial companions and kindred spirits.

Erebia medusa, S. V.—Common, but worn, at Szaàr in June.

E. melas, Hbst.—The last fortnight in July and the first in August is the time to find *melas* on the Domoglet near Herkulesbad. I first saw it on the wing on July 21st, 1897, though Golopenza (my guide) had brought me in one male specimen of it amongst a quantity of *æthiops* a few days prior to that day. It was very common where it occurred, but the ground over which it flew at the top of the mountain was so thickly strewn with huge rocks and boulders that the chase was both arduous and difficult; the females, too, who were much rarer than the males, were also more difficult to catch. From time to time I would see one driven by the wind, fly some ten or twenty yards, and then alight on a rock, taking to flight again the moment I approached, no matter how cautiously, and (what was curious) they were often damaged, whereas the males were in excellent condition. A week or two later they seemed to come down to a lower altitude, and more than once I observed male specimens as far down as the rocky pathway just below the Kreuz, but never lower. This year I left before *melas* was out, for though I made many expeditions to Domoglet I did not observe so much as one example of the species.

E. æthiops, Esp.—Extremely common in all the woods and forests round Herkulesbad in July.

E. ligea, L.—Occurring in the Domoglet and elsewhere; a fine, large form. I saw no *euryale* in that neighbourhood at all.

Satyrus hermione, L.—Common in July in most localities in Hungary.

S. alcyone, S. V.—All the specimens I took at Baden and Mödling near Vienna in August last year seemed distinctly to belong to this and not to the preceding species.

S. circe, F.—Fairly distributed in Hungary and Austria.

S. briseis, L.—This species seemed to be the commonest of the genus. Last year at Mödling it was very common in August; and this year in that same month it occurred in great abundance in most of the localities in the neighbourhood of Buda-Pest, Farkas-Volgy particularly.

S. semele, L.—Very common everywhere.

S. arethusa, S. V.—Very common in the neighbourhoods of Vienna and Buda-Pest in August.

S. statilinus, Hufn.—When I left Hungary towards the middle of August *statilinus* had not yet appeared; but about a week or ten days later Herr Török very kindly sent me a good series (males only) in excellent condition, which he had taken at Csepel-Sziget, near Buda-Pest.

Pararge roxelana, Cr.—This rare and interesting butterfly occurs not uncommonly in the forests round Herkulesbad and Orsova. Last year I was too late to secure fresh specimens, more especially as I had been two weeks in the neighbourhood before I discovered it. In fact, it was already the 27th of July when I made a dash at a good-sized brown butterfly near the white "Kreuz," on my way down from the Domoglet, and found it to be a male specimen, much worn and broken, of *roxelana;* and I afterwards found that it inhabited the forest below the Kreuz; but none of the males were fresh, and the females were so rare that I only succeeded in obtaining two examples, though both were in excellent condition. This year, however, I determined to be in time for it; and on June 23rd, in a wood above Orsova, I secured four males, though I soon found that the Kreuz wood above Herkulesbad was far the best locality for it. It is a difficult butterfly to catch, as it has a habit of flying high and settling out of reach of the net. The best plan (suggested to me by Herr Bourdon) is to mount guard near an old oak tree which has the bark discoloured by a sort of dry resin on which this butterfly feeds with great avidity, and by this means many fine specimens may be secured. The afternoon is better than the morning, as then it seems more inclined to descend from the trees.

P. clymeme, Esp.—If *roxelana* is difficult, *clymene* is ten times more so. It seems to occur only at a considerable elevation, though I did once take one specimen on the road going down to Herkulesbad Station, but this I think was only chance, for there was a strong wind blowing that day, and it must merely have been blown down from the mountains. Except this one solitary exception, *clymene*, as far as I could discover, seemed to be confined to one locality, *i.e.* the forests in the immediate vicinity of the Domoglet. Last year I was too late for it on the 21st of July, though males were common enough in this spot; they were nearly all damaged and worn; and this year it occurred very much more sparingly; besides, I was unlucky in the weather on an expedition I made on July 6th; the clouds rolled up from the valleys, and there was no more sunshine after 9 a.m., so I had to be satisfied with only one fine specimen for that day. On July 11th I again visited this interesting mountain, and saw a magnificent female (the only female I did see), but to my great sorrow she escaped me. Two days later I was there again, but the males were already getting worn, and were far from plentiful. I imagine they last but a very short time in good condition, probably owing to the fogs, and especially the winds which at so great an elevation are almost incessant.

P. hiera, F.—In the woods near Mödling in the beginning of May; and at Hidèg-Volgy, &c., near Buda-Pest, early in August. At Herkulesbad I only observed *mæra*. *Megæra* and *egeria* were also common in most places.

P. achine, Sc.—A very fine form was abundant in the woods at Szép-Juhászué, near Buda-Pest, in the middle of June, but they were all males. Herr Aigner said the female was always rare.

Epinephele lycaon, Rott.—At Isaszegh in June; and again in July and August at Csepel-Sziget; also at Farkas-Volgy, where I took a female with the left fore wing possessing the characteristics of the male.

E. ianira, L.—Common everywhere.

E. tithonus, L.—Common on the Alionberg at Orsova, and at Kavaran-Szakul. I never saw it anywhere else.

E. hyperanthus, L.—Last year in the Cserna Thal in July I took a male with the rings on the under side abnormally large and distinct; and this year in June at the very same spot I took another male, in which this feature was even more strikingly developed.

Cœnonympha œdipus, F.—Occurs in the neighbourhood of Buda-Pest, but I did not come across it.

C. iphis, S. V., and *C. pamphilus*, L.—Both common in Hungary and Austria.

Spilothyrus lavateræ, Esp.—Literally swarms at Csepel and other places near Buda-Pest in July; but I was practically too late for it when I returned there this year, and I did not see or hear of it in the Mehadia district.

Syrichthus carthami, Hüb., *S. alveus*, Hüb., and *S. malvæ*, L.—I do not think I am wrong in stating that these and other species of *Syrichthus* are all to be met with in Hungary and Austria.

S. orbifer, Hüb.—Occurs in the neighbourhood of Buda-Pest in August. I never took one myself; but Herr Török presented me with two males, in excellent condition, he caught one day when we were collecting together at Farkas-Volgy.

Nisoniades tages, L.—Occurs commonly in both countries.

Hesperia thaumas, Hufn., *H. lineola*, O., *H. sylvanus*, Esp., and *H. comma*, L.—All occurred commonly; but I did not see or hear anything of *H. actæon*, Esp., or *H. nostrodamus*, F.

Cyclopides morpheus, Pall.—Was common in the marshy meadows on the borders of the Rohrwald in June and July; also at Weidlingbach near Vienna. I do not recollect observing it anywhere in Hungary, except in the celebrated woods near Peszér.

Carterocephalus palæmon, Pall.—Occurring, but not at all commonly, in the Rohrwald in the beginning of May.

NOTE.—A fresh male specimen of *Melitæa didyma* var. *occidentalis* that I took in North Italy, in August last, has the typical red replaced by rich cream colour.

It now only remains for me to add that the pleasure and success of my expeditions was so greatly enhanced by certain members of the Buda-Pest Entomological Society, that I hope anyone thinking of visiting that place will allow me to have the pleasure of introducing my countryman amongst them, when, I think, I am not wrong in assuring him that he will meet with a warm and hearty welcome. And I should also like to take the opportunity of recommending anyone visiting the Mehadia district to solicit the services as guide of Marien Golopenza, of Pesinesca, a Roumanian peasant of intelligence, and some knowledge of the fauna of his neighbourhood; also able to speak German quite sufficiently well to make himself intelligible.

7, Lansdown Place (East), Bath: November, 1898.

NOTES AND OBSERVATIONS.

Sphœria larvarum, Westw.—I have just seen the interesting notes on *Sphœria larvarum*, by Messrs. George Howes and W. W. Smith, in the 'Entomologist' of June last (*ante*, pp. 128–130). There appears to have been some question as to the liability of wood-boring larvæ to attack from the fungus. As bearing on this point I may mention that I have on several occasions found larvæ of our large wood-boring hepialid, *Phassus purpurascens*, destroyed by this or an allied fungus. In each case my attention was attracted by the appearance of the clavate extremity of the fungus at the opening of the gallery. The stalk extended some six to eight inches down the tunnel, and terminated in the head of the dead larva, whose body was completely filled and extended by the mycelium. To the best of my belief, the larvæ of *Phassus* never leave their tunnels in the tree, so the spores of the fungus must get washed down to them. Their galleries are usually vertical, running down the very centre of the stem, with a lateral aperture at the upper extremity, through which the frass is ejected. This frass does not fall to the ground, but is woven into a thick felt-like curtain, that screens the entrance to the tunnel. The *Phassus* larvæ affect the following trees in this neighbourhood:—*Trema orientalis*, *Cinchona robusta*, *Callicarpa lanata*, and a species of *Rubus*.—E. Ernest Green; Eton, Pundaluoya, Ceylon, October 14th, 1898.

Amphidasys betularia (Linn.) var. doubledayaria (Mill.) in London.—It is interesting to note of late how this variety has become spread over the London districts, and it seems by the notices that the captures have been mostly individual ones, so perhaps the following may be interesting. *A. betularia* has been very common here this season, and maintained its popularity to the end. But the first appearance of *doubledayaria* was not till June 28th, when I took a light melanic male. At first I thought it had been robbed of its pigment, but afterwards found I was mistaken. The next visit to light was July 2nd, when I found another specimen on the ground, losing one the same evening. The cold and windy nights made captures difficult except to the bats. It was not until August 4th or 5th that this variety again came to light, making a total of six specimens, including two found by a boy. I had reason when collecting to note that the majority of the specimens attracted by light were males, and also that this sex showed less tendency to vary than the females.—H. W. Bell-Marley; Ravenscourt Park, W., October 28th, 1898.

Lycæna lycidas.—In reference to the note on *Lycæna lycidas* (*ante*, p. 260), I should like to mention that I took this insect in the valley in which St. Nicholas lies as long ago as 1886, and it had also been taken there a year or two previously. In the same year I took two specimens of it high up on the Gemmi Pass, which Dr. Staudinger, to whom I showed them, pronounced to be an entirely new locality, but I have not heard of their occurrence there since.—R. S. Standen; Thorpe Hall, Colchester, November 2nd, 1898.

Electric Light *versus* Gas Light (Incandescent).—Considering what numbers of insects are attracted by the electric light in our streets, I have often wondered why the incandescent gas lights appear to be less attractive than the lamps with ordinary burners, although the former light is so much more brilliant. Since the installation of the electric light at Shepherd's Bush, I have noticed moths gyrating around the lamps in scores, indeed, sometimes it has been almost bewildering to look up at the whirl of fascinated insects. I still find that the old gas-lamps attract a few specimens, but I rarely notice any tenants on the lamps with the mantle light. I was glad to note that *Eugonia fuscantaria* still occurs in the neighbourhood, as I picked up a fine female which had been smashed by a passing cyclist. I noticed that many moths rest on the roadway for a while, and often renew their giddy flight round the arc-light, the attractive power of which appears to them irresistible. — Alfred T. Mitchell; 5, Clayton Terrace, Gunnersbury, W., October 21st, 1898.

The Pupation of Smerinthus tiliæ.—It has been a matter of speculation as to where the larvæ of certain insects, such as *Smerinthus tiliæ*, pupate when the base of the tree, generally an elm, the foliage of which forms its principal food, is wanting in those warm cosy angles clothed with grass. The ground surrounding these trees is often made so hard by cattle as to defy any larvæ penetrating it. Some time since, whilst examining one of these trees, my attention was attracted by a large quantity of loose bark which hung from the trunk like huge scales. On climbing up the tree some ten or twelve feet and loosening the bark, I was surprised to find two or three pupæ of *S. tiliæ* beneath it; the larvæ had fastened themselves to the bark, which acted as a perfect shelter from wind and storm. During the past two months I have dug under some hundreds of elms, which grow to great perfection in the valley of the Tone, and it is singular that I have never met with more than one pupa of this insect beneath any one tree; perhaps this is accounted for by the foregoing remarks. In the case of *Smerinthus populi*, I have found as many as three beneath one poplar, the bark of which would not allow of the pupation of such large larvæ beneath it.—T. Buckland; East Street, Taunton, November 8th, 1898.

Grasshoppers at Sugar.—Mr. Lucas's account of *Thamnotrizon cinereus*, Linn., being taken at sugar is of some interest (*ante*, p. 267). It is a well-known fact that these Decticidæ are fierce carnivorous insects, and equally well known that they are, partly at least, nocturnal in habits. It would be very interesting to observe whether *T. cinereus* comes to sugar for the sake of the insects which the sugar attracts, or to partake of the delicacy itself. *Meconema varium*, Fab., is not carnivorous, but I doubt whether *T. cinereus* would attack so large an insect. It usually prefers small flies, *Musca*, &c. As to its nocturnal propensities, I have often taken it in hedges, chirping away merrily, between ten and twelve at night in August and September, in the south of England.—Malcolm Burr; New College, Oxford, October 29th, 1898.

CAPTURES AND FIELD REPORTS.

Colias edusa in Sussex.—On Oct. 23rd, whilst walking on the marsh here, I saw a fine male *C. edusa* flying in front of me. It was the first I had noticed this season, and I captured it with my hat, after several attempts. —J. T. Dewey; 26, Willingdon Road, Eastbourne, Oct. 23rd, 1898.

Colias edusa at Chichester.—This species has straggled on here late into the season. A fine male was taken on Oct. 28th. It flew out of the box whilst I was chloroforming it, and was lost in the room. I searched for it everywhere for some time without success. It may have been accidental, but I am disposed to believe it an instance of the power of selection on the part of insects of protective coloration. Quite by chance I discovered the insect on a cloth, hanging from a table, of maroon ground with leaves of old-gold colour. On one of these leaves the butterfly was settled, with closed wings, showing the under sides, which harmonized exactly with the yellow of the leaf.—Joseph Anderson; Chichester.

Xylina semibrunnea at Chichester.—I took a splendid specimen of *X. semibrunnea* at sugar on Oct. 10th.—Joseph Anderson; Chichester.

Cream-coloured Pieris rapæ at Chichester.—A female *P. rapæ*, apparently freshly emerged, was taken at Apuldram on Oct. 10th. It is of a buff or cream-colour, quite as deep in shade as specimens in my cabinet from Scotland and Ireland.—Joseph Anderson; Chichester.

Deilephila livornica in Surrey.—On Oct. 15th a specimen of *D. livornica* was taken by our servants here; it came into the house overnight and was captured in the morning. I suppose this is a rarity?—(Rev.) C. D. Snell; Duncroft, Kenley, Surrey, Oct. 31st, 1898.

Plusia moneta in Surrey.—We took a specimen of *P. moneta* here in the summer. Unfortunately it got into the gas and was much damaged.—(Rev.) C. D. Snell; Duncroft, Kenley, Surrey, Nov. 3rd, 1898.

Sphinx convolvuli, Acronycta alni, &c., in Worcestershire.—On Oct. 4th last a fine example of the former insect was brought to me; it was found on some palings at Moseley. Last spring I bred an example of *alni* from a pupa found among some wood of rotten palings at Hall Green. Near Knowle I found a pupa which turned out *Amphidasys betularia* var. *doubledayaria* (male), which, however, was malformed. I also met with, during the summer, for the first time near Moseley, *Pterostoma palpina* and *Cucullia umbratica*. — A. D. Imms; "Linthurst," Oxford Road, Moseley, Worces.

Deilephila livornica, Sphinx convolvuli, &c., at Portland, 1898. —Of my captures here this year the following are, doubtless, worth putting on record:—*Deilephila livornica*, one taken in my garden whilst hovering over *Silene pendula compacta*, about 9 p.m., on June 12th, in very good condition. *Sphinx convolvuli*, fifty-two taken between Aug. 4th and Oct. 3rd. On the evening of Sept. 17th at least a dozen, I believe, were hovering at one time over a bed of petunias, eight of which I secured. *Macroglossa stellatarum*, plentiful from Aug. 20th till the end of September; about fifty taken. *Heliophobus hispidus*. one hundred and two taken between Aug. 25th and Sept. 27th, on grass and at light. *Aporophyla australis*, twenty-six taken at sugar and light during September.

Vanessa c-album, one taken at sugar in the daytime, on Sept. 17th. The whole of these were caught within fifty yards of my residence, and each species in a very limited area; for instance, the first nine specimens of *S. convolvuli* were captured in a space not exceeding a cubic yard, and *H. hispidus* occurred most plentifully in a portion of a bank measuring about twenty yards by two.—J. T. HYDE; The Grove, Portland.

COLIAS EDUSA IN SUSSEX.—On Tuesday, the 1st inst., a bright sunny day, I saw flying over a bank on the Sea Road, Bexhill, a specimen of the above species. It did not look at all battered, and it settled on the bank, where I had a good view of it.—GWENDALINE MATHEW; Bexhill-on-Sea, Nov. 12th, 1898.

XANTHIA GILVAGO, &C., IN LONDON DISTRICT.—I took three specimens of *X. gilvago* on the incandescent lamps at Roehampton in September. Two were in excellent condition, but the third was rather worn. Amongst the other things taken on the lamps was a moth very like *X. gilvago*, and which from Mr. Tutt's description must be *X. ocellaris*.—G. K. GREGSON; Ardkeen Lodge, Putney, Nov. 12th, 1898.

PHLOGOPHORA METICULOSA IN NOVEMBER.—Mr. E. Hill, of Kingston-on-Thames, and Mr. F. M. B. Carr, of Lee, each note the occurrence of a specimen of *P. meticulosa* about the middle of November last, and the latter asks, "Is not this rather a late date for this species?" It is perhaps unusually but not exceptionally late, as a specimen was taken at Putney on December 26th, 1895 (Entom. xix. 65); and Mr. Armstrong tells me that he saw one on the last day of the year 1872, at Sandown Park.—RICHARD SOUTH, 100, Ritherdon Road, Upper Tooting, S.W.

UROPTERYX SAMBUCARIA IN NOVEMBER.—Is it not very unusual for *U. sambucaria* to appear in the perfect state in November? I bred some of the larvæ of this species (this summer) from eggs laid on the crack willow. Instead of hybernating as usual, two of the larvæ became pupæ in October, and from one of these an imago emerged on Nov. 8th.—ALBERT MAY; Chandos, Hayling Island, Hants, Nov. 18th, 1898.

[In 1896 a specimen of *U. sambucaria* was taken at light on Oct. 2nd, and another example was captured in a garden on the 8th of the same month (*vide* Entom. xxix. 334 and 371).—ED.]

APLECTA PRASINA IN NOVEMBER.—On November 2nd an imago of *A. prasina*, F. (*herbida*, Hb.), emerged in one of my breeding-cages. This was the more striking as in neighbouring cages I have a large brood of larvæ of the same species reared from eggs laid in June, which are now half-grown and commencing to hybernate. The larva which has just resulted in an imago was found in the same locality as the moth which produced the eggs, but a couple of months later.—(Rev.) W. G. WHITTINGHAM; South Wigston Vicarage, Leicester.

ABERRATION OF EPINEPHELE TITHONUS.—I wish to record the capture, in August, on Portsdown Hill, South Hants, of a specimen of *E. tithonus* in which the usual red-brown ground colour of the wings is replaced by pale yellow. I ought to say, perhaps, that this is not a faded or damaged "ordinary" specimen; the outlines of the markings are particularly sharp and well-defined and the colouring quite decided, the latter giving the insect a rather striking appearance when on the wing. I should like to know if this variation is a common one, since I captured a similar one last year in exactly the same spot.—G. M. Russell; 14, Plough and Harrow Road, Edgbaston, Birmingham.

[Judging from our correspondent's description, the variety of *E. tithonus* referred to appears to be somewhat similar in character to that figured and described in the 'Entomologist' for 1897 (xxx. p. 253).—Ed.]

Captures at Street-lamps. — Lepidoptera appear to have been unusually scarce this year in this district, and sugaring more or less of a failure. I made several expeditions to Crabbe Wood, but, with the exception of one night, my efforts met with such very indifferent success that I abandoned it and directed my attention to the street-lamps just outside the town. I practically restricted myself to three lamps, though nine-tenths of my captures were made round one, which was in a most favourable situation; and these lamps I worked every night regularly, with very fair success considering the poorness of the season. Nor was I alone in my nightly rounds. Every night, with the most wonderful regularity, I found waiting for me, outside the gate, a sleek yellow-and-white cat, eagerly expectant, in anticipation of the fat juicy beetles which she knew would fall to her share! And if I failed to keep her supplied, which I sometimes forgot to do in the excitement of a capture, which in my eyes was far more important, she would remind me with a loud mew; neither did she give me any peace until I made amends for my shortcomings by throwing her down one of the cockchafers which were swarming round the lamp. She played with it for a few moments, and then it disappeared with an ominous crunch, and there was a clamour for more of the dainty morsels. Curiously enough, when I was at Oxford, there was a cat which used to follow me round in the same way; I wonder if any other "lamp-workers" have had a similar experience. But "revenons à nos moutons." I was surprised to find so many Sphingidæ coming to light, for, besides plenty of *S. populi*, I took single specimens of *S. ligustri*, *S. convolvuli*, *S. ocellatus*, *S. tiliæ*, *C. elpenor* and *C. porcellus*. The following I found in fair numbers:—*N. saponaria*, *H. genistæ*, *G. papilionaria*, *A. corticea*, *A. cinerea*, *P. bajularia*, *H. thymiaria*, *A. imitata*, *T. amataria*, *E. venosata*, *M. galiata*, *A. rubidata*, *X. sublustris*, *D. conspersa*, *D. carpophaga*, *A. luctuosa*, and *N. senex*. I also took *A. ophiogramma* (2), *A. subsericeata*, *C. quadrifasciaria* (2), *L. viretata* (2), *M. furva* (2), *N. dromedarius* (1), *M. furuncula*, *H. chenopodii* (1), *L. straminea* (2), *Aventia flexula* (1), *E. sobrinata* (1), *E. satyrata* (1), *E. minutata* (2). *E. constrictata* (3), *E. isogrammata*, *H. dipsaceus* (1), *C. furcula* (1), *D. cucubali* (2), *E. lutulenta* (2), *A. suffusa* (1), *A. porphyrea* (1), *B. roboraria* (1), *N. mundana* (1), *C. miniata* (2), *L. aureola* (2); besides many other commoner species. Quite the commonest insects seem to have been *N. festiva*, *E. centaureata*, *O. pudibunda*, *G. trilinea* (I found no less than seventy-eight of the latter on one patch of sugar), *R. tenebrosa*, *H. dentina*, and *E. jacobææ* (which simply swarmed). I took one lovely var. of the latter, in which the usual red marking on all the wings was replaced by a delicate cream, with the faintest suspicion of pink, while the usual dark area of the primaries was of a pale slate-colour; it was in perfect condition, and appeared freshly emerged. I must not omit two fine *E. fuscantaria*, which I took early in October.—H. W. Shepheard-Walwyn; West Downs, Winchester.

Treacle in September and October, 1898.—My father and I paid several visits to a wood in the neighbourhood of Bexley, Kent, for the first time this year, and had some success at treacle. Sept. 14th was our first visit. *Cymatophora diluta* came to the treacle in great abundance and in fine condition. In addition to this insect, *Phlogophora meticulosa. Catocala nupta, Amphipyra pyramidea, A. tragopogonis, Xanthia cerago, Anchocelis litura, Triphæna pronuba, T. fimbria, Gonoptera libatrix, Noctua xanthographa*, and *Hadena proteus* put in an appearance. Sept. 18th (our second visit), we had a most successful evening, taking two magnificent specimens of *Xanthia aurago*, and also one or more specimens each of *X. cerago, X. ferruginea, Hadena proteus, Agrotis saucia, A. corticea, Noctua c-nigrum, Scopelosoma satellitia*, and *Thera juniperata. Phlogophora meticulosa, Anchocelis litura*, and *A. pistacina* were swarming. Sept. 21st, we took *Xanthia cerago, Hadena proteus, Hydrœcia micacea, Cerastis vaccinii*, and *Caradrina cubicularis, Phlogophora meticulosa* and *Anchocelis pistacina*. We obtained a most varied series of the last-named insect, which was a perfect pest. Sept. 25th, *Xanthia ferruginea, Hadena proteus, Agrotis suffusa*, and *A. pistacina;* the latter was abundant. The moon now begun to interfere with the sport. Oct. 2nd, *Miselia oxyacanthæ* (1), *Cerastis vaccinii* (8), *A. pistacina*, and *P. meticulosa*, most abundant. Moon appeared about 6.45 p.m., and the treacle was almost immediately deserted, except for a few *P. meticulosa.* Oct. 9th, beat a rather worn *Xanthia aurago* from an oak at Shoreham, Kent, and obtained two specimens of *Miselia oxyacanthæ.* Oct. 16th, treacled on a sopping wet night in Birchwood, Kent. We counted 125 *Cerastis vaccinii* on about twenty trees, and obtained one example each of *Caradrina cubicularis, Anchocelis rufina*, and *Scopelosoma satellitia*, together with several *Cerastis ligula = spadicea.*—F. M. B. Carr; 46, Handen Road, Lee.

Collecting in the New Forest.—My father and I paid a short visit to the New Forest this year (July 16th to 27th). We had splendid weather, and very fair sport. We were very disappointed in the "treacling," which was an utter failure. During the time we were there we saw one example each of *Acronycta rumicis, Aplecta nebulosa*, and *Calymnia trapezina* only at the sweets; whereas last year, besides about fifteen specimens of *Catocala promissa* and *C. sponsa*, and two examples of *Triphæna subsequa*, we took a number of other insects, and did not have one fruitless night. The time of year was the same, and we treacled the same trees both years. From a local dealer we learnt that everyone in the forest was experiencing much the same luck as ourselves. However, we did fairly well with larvæ, taking *Notodonta trepida* (one full grown and two about three-quarters grown), *N. chaonia, Lophopteryx* (*Notodonta*) *camelina, Acronycta leporina* (one on alder), *Demas coryli, Psilura* (*Liparis*) *monacha* (full grown), *Saturnia carpini, Dasychira* (*Orgyia*) *pudibunda* (very small), *Amphidasys prodromaria, Anarta myrtilli* (abundant, all sizes), *Asphalia ridens, Panolis* (*Trachea*) *piniperda*, several *Corycia temerata, Fidonia piniaria, Thera obeliscata, Bombyx rubi*, and a number of geometers.

The following insects came indoors to light:—*Pseudoterpna cytisaria, Macaria notata, Hemithea thymiaria, Selenia bilunaria* (*illunaria*), *Cidaria dotata, Uropteryx sambucaria, Iodis vernaria* (splendid condition, one only), *Boarmia rhomboidaria, Cidaria fulvata, Arctia caia, Spilosoma menthastri, Bryophila perla, Leucania pallens, Noctua xanthographa, Agrotis porphyrea* (most commonly), *Caradrina alsines, Plusia gamma, Apamea oculea, Xylophasia polyodon*, and *Leucania conigera.*

Of the Rhopalocera, *Argynnis paphia*, though abundant, was not in such abundance as in 1897. We took two *Valesina. Limenitis sibylla* (very abundant and in much better condition than at the same time last year), *Thecla quercus* (extremely scarce, in 1897 abundant), *Gonopteryx rhamni* (appeared on July 24th), *Argynnis adippe* (fairly plentiful, and in fine condition), *A. aglaia* (not so plentiful or so good as the last), *Satyrus semele* (abundant), *Pararge egeria* (swarming in 1897; this year we did not see one), *Melanargia galatea* (found in one field only, but was fairly plentiful and in splendid condition there), *Lycæna ægon* (most abundant).

Of the moths, *Lithosia griseola*, and especially the variety *stramineola*, was very plentiful. July 23rd we took a fine *L. complana* on some bracken, *Calligenia miniata* (very abundant), and we also took *Lithosia helveola*, *L. mesomella*, and *L. quadra*, *Euthemonia russula* (two, worn, were seen flying over heath), *Hepialus hectus* (abundant and in splendid condition, flying at dusk), *Psilura monacha* (not nearly so plentiful as in 1897). We took a fine female of *Demas coryli*, beaten from a beech tree. Also, *Metrocampa margaritaria* (abundant and fine), *Ellopia fasciaria* (a few worn specimens), *Cleora glabraria* (worn), and *C. lichenaria* (one only), *Boarmia roboraria* (a fine pair on a beech-trunk), *Amphidasys betularia* (a fine female), *Tephrosia crepuscularia* (one), and *T. extersaria* (one, worn) *Gnophos obscurata* (very abundant indeed on some of the heaths, and obtained by tapping with a stick in furrows at the roots of the heather, when they flew out in great profusion), *Pseudoterpna cytisaria* (very fine), *Phorodesma bajularia* (good), *Ephyra trilinearia* (very abundant, by beating beeches), *Hyria auroraria* (flying over heather in the sunshine), *Asthena luteata*, *Eupisteria heparata*, *Acidalia scutulata*, *A. bisetata*, *A. trigeminata*, *A. incanaria*, *A. imitaria*, and *A. aversata*, *Macaria liturata* (abundant in pine woods), *Selidosema plumaria* (by beating heaths, males only), *Fidonia atomaria* and *Bupalus piniaria* (a fine female), *Ligdia adustata*, *Pachycnemia hippocastanaria*, *Larentia didymata*, and *L. pectinitaria* (worn), *Emmelesia decolorata*, *Hypsipetes elutata* (very abundant), *Melanthia rubiginata* and *M. albicillata*, *Melanippe unangulata*, *M. rivata*, *M. montanata* and *M. galiata*, *Coremia propugnata*, *Cidaria fulvata* (very abundant on the wing at dusk), *C. dotata*, *Eubolia mensuraria* and *E. palumbaria*, *Tanagra atrata* (*chærophyllata*) (flying over bracken in the sun), *Aplecta nebulosa* (tree-trunks), *Hylophila prasinana*, *Heliothis dipsacea* (one, flying over heather in the sun, captured after a most exciting chase), *Anarta myrtilli* (plentiful and in fine condition), *Agrotis porphyrea* (very abundant), *Phytometra ænea*, *Acronycta psi* (most abundant on pine-trunks), *Thyatira batis* (one at heather, worn), *Cerigo cytherea* (one, fine), *Apamea oculea*, and many others.—F. M. B. Carr; 46, Handen Road, Lee, S.E.

Captures during 1898 in the Galashiels District.—My first capture of the year occurred on the evening of Feb. 14th, when by the aid of a light I secured a few males and one female of *Hybernia marginaria* from a whitethorn hedge. On Feb. 20th, *H. leucophæaria* and *Anisopteryx æscularia* were taken at rest on palings. The sallows were out early in March; I worked them on eight different occasions from March 11th to April 23rd, but met with poor success. The following insects were taken: —*Tæniocampa gothica* (the commonest), *T. incerta*, *T. stabilis*, *T. pulverulenta*, and *T. rubricosa;* hybernated specimens of *Calocampa exoleta*, *Scopelosoma satellitia*, and *Cerastis vaccinii* also turned up in excellent condition. On the evening of March 11th *Larentia multistrigaria* was extremely abundant; large numbers of the insect came fluttering to the light I carried when working the sallows. I had no net with me, but managed to bottle a few which alighted on the clothing of a friend who accompanied me. Next evening I proceeded to the same spot in possession of a net, as I wanted a few more specimens of the insect; but, to my great disappointment, although the evening was milder if anything than the previous one, not a single insect was attracted by the light, nor did I again notice it on any other evening. The males of *Diurnea fagella* were abundant and very variable on oak-trunks during the beginning of April; the females were scarcer, only three or four being seen. On the evenings of April 21st and 23rd larvæ of the following species were taken plentifully from a whitethorn hedge near the town:—*Triphæna ianthina*, *T. fimbria*, *T. orbona*, *Noctua triangulum*, and *N. baia;* also a few *Boarmia repandata.* With the assistance of a lantern these larvæ are easily found after dark, climbing up the almost naked twigs of whitethorn to reach the opening bud. The larvæ of *Chelonia plantaginis* were very scarce this season in the locality where they are usually plentiful enough; although I searched the spot several times during April, I only picked up a very few. Sugaring was tried for the first time this season on May 10th, but resulted in a complete failure: not a single insect turned up. On May 15th—a lovely day—I paid my annual visit to a moor where larvæ of *Orgyia fascelina* occur, and found them in all stages of growth as usual, from about a quarter to nearly full-fed. Several males of *Saturnia carpini* were observed flying in the bright sunshine. From May 21st to 31st I paid several visits to Ellwyn Hill, and collected larvæ of *Scodonia belgiaria* and *Bombyx quercus.* I also picked up several cocoons of *Arctia fuliginosa*, and took the following insects on the wing: *Fidonia atomaria*, *Melanippe subtristata*, and *Phytometra ænea.* A very fine lot of *Anarta myrtilli* were also obtained at rest on the top of the heather, several being found in cop. I have tried for some time past to induce the female of this insect to deposit her ova in confinement, but have been completely disappointed every season. I should be very pleased to hear from any entomologist who has had success in this direction. A fine specimen of *Hadena glauca* was taken at rest on heather on June 4th; also on the same day, *Hadena dentina*, *Scodiona belgiaria*, and *Hypsipetes impluviata*, the latter at rest on alder trees. A week later, when returning from a very unsuccessful day's collecting on Ellwyn Hill, I observed the males of *Bombyx rubi* flying over the heath abundantly; this was about 6 p.m. I noticed that when struck at with the net they ascended straight up into the air, sometimes so high as to be completely lost sight of. During the latter end of June, dusking along the rides of a wood produced the following insects:—*Rumia cratægata*, *Metrocampa margaritata*, *Ellopia fasciaria*, *Odontopera bidentata*, *Boarmia repandata*, *Cabera pusaria*, *Fidonia piniaria*, *Larentia pectinitaria*, *Thera simulata*, *T. variata*, *Hypsipetes impluviata*, *Melanthia ocellata*, *Melanippe tristata*, *M. rivata*, *M. subtristata*, *M. montanata*, *Camptogramma bilineata*, *Cidaria suffumata*, *C. silaceata*, *C. fulvata* and *C. pyraliata*, *Eubolia palumbaria*, *Hepialus lupulinus* and *H. humuli*, *Noctua plecta;* and by other methods, *Acronycta psi*, *Hecatera serena*, *Caradrina cubicularis*, *Rusina tenebrosa*, and *Arctia menthastri.* On June 19th a very fine specimen of *Acronycta menyanthidis* was taken at rest on an ash-trunk. By July 2nd *Lycæna astrarche* var. *artaxerxes* was well out, and in company with it were *L. alexis*, *Cœnonympha pamphilus*, *Satyrus ianira*, and *S. hyperanthes.* On July 10th I took a good specimen of *Amphidasys betularia* at rest on the ground, and found the remains of another, which had evidently been attacked by a bird, near the same spot. On July 12th one specimen of *Thyatira batis* was taken flying at dusk. Sugaring was again tried on the night of July 13th, but with poor result, the total take being three *Agrotis exclamationis* and two *Acronycta ligustri*. From July 13th to the end of August sugaring was tried at intervals of four nights—this was along the rides of a wood, composed of all sorts of trees and thick undergrowth; but night after night had the same result—an empty bag. Getting quite exasperated at such profitless work, my friend Mr. Tait, who always accompanies me on sugaring expeditions, suggested the idea of sugaring the posts of a wire-fence which crosses a piece of moorland near the town. This was done several times during the month of August, and was very successful as regards the number of insects which turned up, although they were of the commonest types. The following species were taken:—*Noctua xanthographa* (in great variety), *N. festiva* (also in great variety), *Leucania lithargyria*, *Xylophasia polyodon* and var. *infuscata*, *Agrotis porphyrea*, *Charaxes graminis*, and *Triphæna pronuba*. *Larentia cæsiata* was taken on the wing at dusk. By Aug. 1st *Erebia blandina* was out in plenty in its usual haunts. I notice that the females are always a week behind the males in making their appearance. It was not till the beginning of September that sugaring began to yield well, and from then up till the time of writing the following insects have been taken plentifully by that means:—*Triphæna orbona*, *Amphipyra tragopogonis*, *Orthosia macilenta*, *Anchocelis litura*, *Cerastis vaccinii*, *Scopelsooma satellitia*, *Xanthia ferruginea*, *Cosmia trapezina*, *Polia chi*, *Epunda nigra* (over fifty specimens were taken), *Miselia oxyacanthæ*, *Agriopis aprilina*, *Phlogophora meticulosa*, *Hadena proteus*, *Calocampa exoleta*; also the following: *Hydræcia nictitans* (two), *Miana fasciuncula* (a few), *Agrotis suffusa* (one), *Noctua glareosa* (three), *Triphæna fimbria*(a few), and *Anchocelis lunosa* (one); and by other means, *Diloba cæruleocephala* (one), *Oporabia dilutata*, *Cidaria miata*, and *Chesias spartiata*.—James C. Haggart; 29*a*, St. John's Street, Galashiels, Nov. 1st.

Notes from the Chester District.—Butterflies have been comparatively scarce this season, the only common ones being *Pieris rapæ* and *P. napi*. *P. brassicæ* was fairly represented, but local. Dragonflies have also been below the usual number—exceptionally so in the species *Agrion puella* and *Æschna grandis*.

Moths such as *Grammesia trilinea* and *Agrotis exclamationis*, with an occasional *Thyatira batis*, came to sugar in June. At the end of the month this attraction fell off as the plants and grasses blossomed and a copious honeydew appeared. About the middle of August sugar was again worth trying, and fine varietis of the following species were taken:—*Triphæna pronuba;* from pale grey (primaries) to dark, unicolorous chestnut (var. *innuba*). *Apamea oculea:* (1), *furca*, primaries dark brown, the lower half (or nearly so) pale grey, or, in other examples, coppery, with a broad waved band of the same shade parallel with the outer margin, beginning at the apex and continued to the inner margin; (2), "*rava*, brown across centre, base and hind margin paler"; (3), "*i-niger*, a distinct — -like mark below the stigmata"; (4), "*leucostigma*, black, with distinct white stigmata." (Robson and Gardner's List, p. 17). *Xylophasia monoglypha* (*polyodon*): (1), grey, with black shades and wedge-like marks on primaries (an intermediate form); (2), "*infuscata*, black, or nearly so." (Robson and Gardner). Other moths were *Mania maura* (local, but plentiful), *M. typica*, *Noctua rubi*, *N. xanthographa*, *Amphipyra tragopogonis*, *T. orbona*, *Xanthia cerago*, *Leucania lithargyria*, *Cidaria testata*, and *Alucita hexadactyla*. In September sugar drew *X. ferruginea* and *Anchocelis litura*.

But the captures at the city electric lamps were the great feature of the season. Moths were taken new as well as rare to the district. Foremost stands a fine female *Sphinx ligustri*, captured by Dr. Herbert Dobie on the night of July 15th—a new insect, although there is good authority for the occurrence of larvæ some years ago at Upton, three miles away. It may be interesting, as showing the range of this insect, to say there is equally good authority for the occurrence of the larvæ of this fine hawk-moth near Manchester, and at Grange, in North Lancashire. Dr. Dobie also captured a few specimens of *Eupithecia centaureata*, hitherto only recorded, as far as I know, for Wallasey and Bidston. *Mamestra persicariæ* appears in Mr. A. O. Walker's list as common in the larva state near Holywell, North Wales, on *Pteris aquilina*. This is the only district record I can find; but the moth appeared commonly enough here at the electric lamps, in July. *Notodonta dictæa* (hitherto only recorded for the Wirral and Holywell) was so common that it was frequently left as not worth the taking. Several specimens of *N. dictæoides* were captured, although the species is marked "scarce," and only at Bidston, about twenty miles away on the Cheshire side of the Mersey. I was from home during the greater part of July, but here is a list of a night's captures, kindly supplied me by the Messrs. Thompson, which is fairly representative of our July moths at the electric lamps up to the appearance of *N. dictæa* and *N. dictæoides* on the 19th. *Smerinthus ocellatus*, *S. populi*, *Euchelia jacobææ*, *Arctia caia*, *Spilosoma lubricipeda*, *S. menthastri*, *Porthesia similis* (*auriflua*), *Acronycta rumicis*, *X. monoglypha* (*polyodon*), *Triphæna pronuba*, *Phalera bucephala*, *Leucania pallens*, *Miana strigilis* var. *æthiops*, *Noctua rubi*, *Agrotis exclamationis*, *Hadena oleracea*, *Plusia chrysitis*, *P. festucæ* (first brood), *P. iota*, *Amphidasys betularia* var. *doubledayaria* (plentiful during the month, but all black forms), *Uropteryx sambucata*, *Abraxas grossulariata*, *Timandra amataria*, and *Spilodes verticalis*.

My method of capture was not to take a net, but wait for the moths settling on the ground or stonework about, and then box them. On reaching home I lifted the lid of each box a little, inserted a narrow strip of paper previously dipped in chloroform, and then closed the box. After all the boxes had been so treated, I took out the insensible moths, and killed them by sticking a sharp pin, dipped in a solution of oxalic acid, carefully between the front legs. The moths were then perfectly relaxed and ready for setting, but I kept them over night, as a rule, in a closed jar three parts filled with damp sand, on which was a layer of cotton-wool. Twelve or fifteen drops of carbolic acid were well mixed with the sand to prevent the formation of mould.

My captures for the next three months were the following:—

August. — *A. caia*, *P. similis* (abundant), *X. polyodon*, *Bryophila perla*, *T. fimbria* (hitherto a scarce moth), *T. ianthina*, *T. pronuba*, *T. orbona*, *L. cespitis*, *L. testacea* (some with almost black markings, others almost unicolorous pale brown), *Miana literosa*, *M. furuncula*, *A. oculea*, *N. rubi*, *L. conigera*, *L. lithargyria*, *Neuronia popularis*, *S. populi* (one only, a large freshly emerged female, taken Aug. 23rd—surely representing a second brood), *P. gamma*, *Selenia illunaria* var. *bilunaria* (the summer brood, smaller and paler than the March form), *Crocallis elinguaria*, *Acidalia scutulata*, *Halia vauaria* (*wavaria*), *Ellopia fasciaria* (one; hitherto I have only taken it in Delamere Forest), *Eugonia* (*Ennomos*) *fuscantaria* (Entom. xxvi. 52), *Hypsipetes elutata*, *C. truncata* (*russata*), (with the variety *comma-notata*, "black," but with the median area of the primaries russet), *Melanippe fluctuata*, *Eugonia alniaria* (*tiliaria*), *Platypteryx hamula* (new to the district; one, Aug. 11th; another by Dr. H. Dobie about the same date), *Scopula lutealis*, *Cataclysta lemnata*, *Tortrix ribeana*, *Scoparia mercurialis*, *Tinea tapetzella*.

September.—The moths began to thin off. *Amphipyra tragopogonis*, *Epunda lutulenta* (two, a male and female; a rare insect here). The "heat-wave" which had so marked the summer returned Sept. 5th, but the moths were only one each, on that date, of the following species:—*Anchocelis litura*, *A. tragopogonis*, *E. lutulenta* (one of the two referred to; the other I took Sept. 1st), and *M. fluctuata*. Continuing the list:—*Hydrœcia micacea* (one almost black), *P. festucæ* (second brood), *Tapinostola fulva*, *A. litura*, *Nonagria arundinis* (*typhæ*), *X. ferruginea*, *A. pistacina* with the following varieties: (1) "*lineola*, ferruginous, nervures distinctly paler"; (2) "*ferrea*, reddish, nearly unicolorous"; (3) "*serina*, pale yellow ochreous, nearly unicolorous" (Robson and Gardner); *N. c-nigrum*, *Miselia oxyacanthæ* (with very dark forms), *Phlogophora meticulosa*, *M. fluctuata*, *E. fuscantaria*, *E. tiliaria*, *Thera variata*, *Depressaria ciliella*. Earwigs, spiders, caddis-flies, with an occasional beetle, which had all along come to the lights, now began to get scarce. On Sept. 2nd a fine full-grown larva of *Acronycta alni* was brought to me for identification. It had been found feeding on sycamore.

October.—*A. pistacina*, *P. gamma* (even to the end of the month), *Diloba cæruleocephala*, *H. micacea*, *Dasypolia templi* (one only, a fine fresh female, taken Oct. 8th; previous record, one specimen at Bidston Lighthouse), *P. meticulosa*, *M. oxyacanthæ*, *N. c-nigrum*, *Tethea retusa* (one, a fine fresh example, taken Oct. 24th; another was captured by Dr. H. Dobie. This species has not been previously recorded for the district, according to Mr. A. O. Walker's list).—J. Arkle; Chester.

SOCIETIES.

Entomological Society of London.—*November 2nd*, 1898.—Mr. G. H. Verrall, Vice-President, in the chair. Mr. Ambrose Quail, of Palmerston North, New Zealand, was elected a Fellow of the Society. Mr. Merrifield exhibited some *Melitæa aurinia* from Touraine forced and cooled as pupæ, the latter being much the darker and more strongly marked; some *Euchloë cardamines* from Sussex, those cooled having the apices of the wings darker and the discal spots smaller than those which have been forced; and some *Colias edusa* from eggs laid by two normal females taken in Savoy, two out of the five reared being of the var. *helice*; the marginal border of one male, which had been forced, was very pale and much suffused with long yellow scales. He also showed four *Papilio machaon*; two of them, forced as pupæ, had their dark parts very pale and their tails long and slender, the two which had been cooled having the dark parts much extended in area and darkened in hue, their tails being short and broad. These results, which were to be obtained with winter as well as summer pupæ, corresponded with those previously obtained by Dr. Standfuss. Mr. J. J. Walker exhibited two winter nests of *Porthesia chrysorrhœa* from the Isle of Sheppey, where the species had lately become very common. Dr. Mason exhibited a Buprestid larva found among Baltic timber at Burton-on-Trent. This had been among wood in a box since the beginning of July last, and there was scarcely a trace of frass. Marsham had recorded the escape of a larva of *Buprestis splendens* from the wood of a desk in the Guildhall, which had stood there for more than twenty years. It is probable that the growth is extraordinarily slow, and consequently that the larva can maintain life for very long periods in most unfavourable conditions. Mr. Blandford called attention to similar cases which he had brought before the Society. It appeared likely to him, from what was known about such nsects as *Callidium variabile*, which was occasionally bred from dry wood at long intervals, that these species were not abnormally slow-growing under normal conditions, but become so in dry timber, in which they probably sustained life with difficulty, especially when the outside of the wood was varnished. Mr. Waterhouse exhibited, for Mr. G. W. Kirkaldy, living examples in various stages of a *Cayoborus* in nuts of *Attalea funifera* from Brazil. Elditt had described the attacks of an allied species upon the seeds of *Cassia fistula*. Mr. Tutt exhibited, for Dr. Chapman a series of *Zygæna exulans*, from Finmark, and discussed the differences between them and the Scotch form. Papers were communicated by Mr. W. F. H. Blandford "On some Oriental Scolytidæ of economic importance, with Descriptions of five new Species"; and by Mr. van der Wulp (through Col. Yerbury) on "Asilidæ from Aden and its neighbourhood."

November 16*th*.—Mr. R. Trimen, F.R.S., President, in the chair. Dr. A. L. Bennett, Mission Protestante, Libreville, French Congo; Mr. J. G. McH. Gordon and Mr. R. S. G. McH. Gordon, of Corsemalzie, Whauphill, Wigtonshire; Mr. J. A. Kershaw, of Morton Banks, Lewisham Road, Windsor, Melbourne, Victoria; Mr. A. G. Lethbridge, of Glynde Place, Lewes; Mr. W. J. Lucas, B.A., of Minerva Road, Kingston-on-Thames; Mr. R. H. Relton, c/o Perkins and Co., Ltd., Brisbane, Queensland; and Dr. A. J. Turner, of Wickham Terrace, Brisbane, Queensland, were elected Fellows of the Society. Mr. Tutt showed, for Mr. Herbert Williams, a series of specimens of *Pararge egeria* bred from eggs laid in July. A portion of the brood were forced, and the imagos, which emerged in November and December of the same year, showed marked darkening of the hind margin of the under side of the hind wings, and were of a greyer colour than those which appeared at the normal time. He also exhibited a batch of fifty specimens of *Amphidasys betularia* bred from ova deposited by a female captured in Essex. The progeny ranged from a colour rather lighter than the normal form to a blackish tint almost equal to that of var. *doubledayaria*; all intergrades were represented without a sign of discontinuity. Mr. H. J. Elwes gave an account of a journey undertaken by him in June and July of the present year to the Russian portion of the Altai Mountains, partly for sport and partly to investigate the distribution of insects in that region, and the line of demarcation between the Eastern and Western Palæarctic subregions. He exhibited examples of 141 species of butterflies taken by himself. Of these many had not been previously recorded from the region, of which the total number of species now stood at 184; his list showed that the lepidopterous fauna had a more European and Siberian character than previously supposed, or than Seebohm had found to exist in the avifauna. The number of undescribed species taken was small, but several forms were previously known only from remote localities, such as *Melitæa iduna*, hitherto recorded from the fells of Lapland. Few Heterocera were taken, but among them was the third recorded example of *Arctia thulea*, Dalm. Dr. A. G. Butler communicated a paper "On some new species of African Pierinæ in the collection of the British Museum, with notes on seasonal forms of *Belenois*."—W. F. H. Blandford, *Hon. Sec.*

South London Entomological and Natural History Society.—*October* 13*th*.—Mr. J. W. Tutt, F.E.S., President, in the chair. Mr. Russell, The Limes, Southend, Catford, was elected a member. Mr. Drury, F.R.H.S., presented a large number of Tortrices and Tineæ to the Society's collections. Messrs. Ashdown and Lucas presented numerous specimens of Dragonflies. Mr. Moore exhibited a series of *Polia chi* from Yorkshire; they were taken at rest on dark stone hedges, and were most conspicuous even from a distance. Mr. Fremlin, for Mr. Auld, eleven hybrids between *Pygæra curtula* and *P. anachoreta*, bred by Dr. Knaggs in April, 1898, together with typical specimens of both species for comparison. It was noted that the markings for the most part followed the female parent *P. curtula*. He also showed various races of the Tephrosias, *T. laricaria* and *T. biundularia*; a fine bred series of *Phorodesma bajularia* from the New Forest; specimens of *Zonosoma annulata* var. *obsoleta* from Devon; unusually dark forms of *Emydia cribrum*; a few *Eugonia autumnaria*, bred from a female taken at Folkstone; and a bred series of *Hemithea strigata* (*thymiaria*). Mr. Turner, a bred specimen of *Vanessa polychloros* from Horsham, much darker and comparable to some of those produced in Mr. Merrifield's temperature experiments. Mr. Kaye, a Syntomid moth, *Macrocneme lades*, from Venezuela, and a species of wasp which it mimicked. It had a remarkable development of the hairs on the long posterior legs. Mr. West, of Greenwich, specimens of the Hemipteron, *Ploiaria vagabunda*, from Reigate. Mr. Tutt read a paper entitled ' Scientific Aspects of Entomology."

October 27*th*.—The President in the chair. Mr. Ashdown exhibited twenty species of British Longicorn Coleoptera, which he had brought to add to the Society's collections. Mr. Montgomery a specimen of the third brood of *Cyaniris argiolus*, bred Sept. 30th; specimens of three broods of *Selenia bilunaria*, of which the third brood followed the second; and bred specimens of a third brood of *Coremia ferrugata*. Mr. Mansbridge, two blue female examples and two underside vars. of *Polyommatus bellargus*. He remarked that the females of this species appeared to get more blue year by year. Mr. Dennis, pupa and cocoon of both *Chærocampa elpenor* and *Sphinx ligustri*. Mr. Tutt, on behalf of Mr. Gordon, a considerable number of species taken in Wigtonshire: including *Saturnia pavonia*, with much red on the hind wing; a pale-fawn *Smerinthus populi; Phalera bucephala*, with right fore wing dark; *Cænonympha typhon*, chiefly var. *rothliebii;* strongly banded *Pelurga comitata;* and others. Mr. Adkin, variable series of *Bryophila perla*, *B. muralis*, and *Botys flavalis*, to illustrate his paper entitled "Lazy Days by the Sea." A discussion ensued.

November 10*th*.—The President in the chair. The evening was devoted to a special exhibition of varieties, and was a most successful gathering. Mr. Robinson exhibited, on behalf of Mr. A. H. Jones, of Eltham, specimens of the following species and varieties:—*Lycæna corydon*, a light-brown female; *Melanargia galatea*, an unusually perfect white band; *Argynnis paphia* var. *valesina*, with basal spots confluent; *Xanthia aurago*, nearly unicolorous; *Ephyra pendularia*, with red suffusion; *Thais cerisyi*, a melanic female from Armenia; and *Argynnis pales*, var. *arsilache*, from the Engadine. Mr. Robinson also exhibited gynandromorphous specimens of *Cleora lichenaria* and *Crocallis elinguaria* from the New Forest. Mr. Chittenden, *Xanthia aurago*, bred, yellow, pink, and dark forms; *Anchocelis lunosa*, a red form and a black form; black forms of *Agrotis corticea* and *A. segetum; A. exclamationis*, red form; and a pair of beautifully marked *Tæniocampa incerta*. Mr. Williams, a long bred series of *Pararge egeria*, very brilliant in colour; and also a fine bred series of *Amphidasys betularia*, derived from ova of an ordinary female, and showing a strong melanic tendency, in some specimens almost reaching var. *doubledayaria*. Mr. Mansbridge, *Cabera pusaria*, var. *rotundaria*, bred, from Kent. Mr. Edwards, *Abraxas grossulariata*, in which the white areas were closely dusted with fine black dots, and having the orange markings very intense. Mr. Rose, a fine series of *Xanthia aurago*, rich uniform red, bright canary coloured, and banded forms of all shades, from Reading. Mr. Butler, of Reading, *Stauropus fagi*, ordinary, dark, pale, and intermediate forms, together with specimens of a second brood; also exceptionally dark forms from an August pairing; a very dwarf captured *Luperina testacea; Xanthia aurago*, a series showing all the named forms, together with an undescribed pink form; and a greasy-looking form of *Vanessa io*. Mr. Tutt, specimens of a *Zygæna* received from M. Oberthür, of Rennes, named by him *Z. palustris*, and apparently identical with the large form of *Z. trifolii* = *Z. trifolii major*, also a marsh-frequenting form; two cabinet drawers of British Argynnids and Brenthids for comparison with Dr. Chapman's exhibit of the same species; and a long series of *Brenthis pales* from various Continental localities. Mr. Pearce, a considerable series of *Bryophila perla* from Folkestone, among which were a good proportion of the leaden form. Mr. South, a bred series of thirty-five *Spilosoma lubricipeda*, var. *zatima*, and seven males of the type, from the same batch of *zatima* eggs; *Eubolia limitata*, light golden-brown forms, and very dark specimens; *Boarmia cinctaria*, a light form, bred from Irish ova; and *Hydrœcia micacea*, bred from larvæ found in potato stems; the latter were sent to him by Miss Ormerod. Dr. Chapman, very long series of *Aglais urticæ* and several species of European Argynnids, and read notes on their modifications in the various localities he had visited in Europe. Mr. Lucas, series of *Libellula quadrimaculata* and of *Calopteryx virgo* from his own and Rev. J. E. Tarbat's collection, showing great variation; the var. *prænubila* of the former species and three smoky males of the latter, from Surrey, were very noticeable. Mr. Nevinson, *Cleora glabraria*, very dark; *Fidonia clathrata*, almost unicolorous; *Acidalia contiguaria*, light and dark forms; *Fidonia atomaria*, male with female coloration; *Carpocapsa pomonella*, unicolorous pale form, bred from a walnut. Mr. Adkin, local forms of *Aplecta occulta*, some magnificent dark specimens; *Dianthœcia nana* (*conspersa*), from all the chief British and Irish localities; and a drawer of Argynnids and

Brenthids. Mr. Moore, some grand under side forms of the leaf-butterfly, *Kallima inachis;* and a series of *Salamis antera.* Mr. West, of Streatham, *Vanessa atalanta*, without spots in the red marginal band of the hind wings; and *Catocala nupta*, with unpigmented streaks on the hind wings.—Hy. J. Turner, *Hon. Report. Sec.*

Birmingham Entomological Society.—*October* 17*th*, 1898.--Mr. G. T. Bethune-Baker, President, in the chair. Mr. Wainwright exhibited a specimen of *Periplaneta australasiæ* from an orchid house at Forgandenny in Perthshire, where it has been observed for three years now, and was causing a good deal of damage. Mr. Bradley showed *Andrena humilis* with its parasite *Nomada ferruginata*, from Sutton, where he had discovered a largish colony this year, the parasite being very numerous with its host. Mr. W. Harrison, insects from Witherslack, *Acronycta menyanthidis*, *Lycæna minima*, &c.; also *Callimorpha dominula* from the Stroud district, and other insects. Mr. G. H. Kenrick, *Lycæna arion*, from the Cornish locality, and other insects from the same place, including several fine examples of the var. *conversaria* of *Boarmia repandata; Acronycta ligustri*, *Lobophora sexalisata*, *Macaria alternata*, &c. Mr. J. T. Fountain, a collection of Lepidoptera made in the valley of the Wye above Tintern during six days' collecting last August bank holiday; it showed the locality to be rather rich, the insects including *Apatura iris*, *Thecla w-album*, *T. quercus*, *Drepana unguicula*, *Cerigo matura*, *Ephyra trilinearia*, *Cleora glabraria*, *Melanippe unangulata*, *Larentia olivata*, and many others. Mr. A. H. Martineau, a little lot of insects bred from bramble stems at Solihull, *Pemphredon lethifer*, Shuck., with its parasites, *Ellampus auratus*, L., and *E. æneus*, Fab. Mr. G. T. Bethune-Baker, two drawers of palæarctic Venessidæ. —Colbran J. Wainwright, *Hon. Sec.*

Manchester Microscopical Society.—*October* 20*th*, 1898.—In the Biological course in connection with the Mounting Section of this Society, the work mainly consists of demonstrations in comparative anatomy and histology. At the previous meetings the dissection of the larva and imago of the moth, and the preservation of lepidopterous larvæ, have been practically illustrated. This evening Mr. John Watson gave the first of a series of three demonstrations on the structure of the imago butterfly. Dealing with the general characters of a lepidopterous insect, he showed the distinction between them and those of the Coleoptera, Hymenoptera &c.; then proceeded to describe the appearance of the antennæ, palpi, and mouth parts, the legs and tarsal appendages, wings with reference to neuration, androconia and other secondary sexual characters, and the genitalia and anal tufts as found in so many of the eastern Pierids, pointing out the special features with regard to systematic classification. Reference was also made to the pouches of *Parnassius;* and the grandular structure from which the pouch-forming fluid is secreted by the males of *Parnassius hardwickii* and *P. glacialis* was exhibited by means of the microscope. The demonstration was illustrated by specimens from Mr. Watson's collection, and a large number of microscopical preparations.—O. C. Stump, *Hon. Sec.*

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PLATES.

I.—Aquatic Rhynchota (Structural) . . . . May.
II.—Mecostethus grossus (2 Figs.) . . . . . . July.
III.—Thamnotrizon cinereus (Fig. 1), Xiphidium dorsale (Fig. 2) December.

FIGURE IN TEXT.

Tephrosia biundularia ab. . . . Page 241.

ERRATA.

Page 12, for "Two New Genera of Lecaniinæ Coccidæ" read "Two New Genera of Coccidæ."
,, 13, at bottom, for "*Aspidiotis*" read "*Aspidiotus.*"
,, 29, line 26, for "*colossicum*" read "*collossicum.*"
,, 134, line 43, for "*bousdorffi*" read "*bonsdorffi.*"
,, 198, line 15, for "*Melanippe unifasciata*" read "*M. subtristata.*"
,, 220, line 26, for "*nigrideus*" read "*nigridens*"; line 36, for "*Philontochila*" read "*Philontocheila.*"
,, 231, line 23 from bottom, for "*ante*, p. 179," read "*ante*, p. 169"; line 3 from bottom, for "*ante*, p. 219" read "*ante*, p. 213."
,, 251, line 17 from top, for "*T. betularia*" read "*T. betulæ.*"

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NOTES ON THE GENUS *EUCHLOË*, Hübner, A GENUS OF THE PIERINÆ.

By A. G. Butler, Ph.D., F.L.S., F.Z.S., &c.

For many years a number of Palæarctic species stood in collections under Boisduval's generic name *Anthocharis;* but eventually it was discovered that this genus was, to all intents and purposes, a synonym of *Euchloë*, Hübner, which consequently superseded it.

Meanwhile, for a single species with strongly falcated primaries Herrich-Schäffer proposed the name of *Midea*, and to this group I subsequently added two species—*M. scolymus* from Japan and *M. limonea* from Mexico. (I did not, however, recognize *Midea* as a genus.)

When Schatz reviewed the genera of butterflies in Staudinger's 'Exotische Schmetterlinge,' he raised *Midea* to the rank of a genus, and divided *Euchloë* (which he called *Anthocharis*) into two genera, calling the orange-tips *Anthocharis* and the whites *Phyllocharis* (entirely overlooking the fact that the latter name had been used in 1824 for a genus of Coleoptera). Schatz figured, and somewhat distorted, the neuration of one species in each group, with the object of showing principally that in *Euchloë* (=*Anthocharis*, Schatz) the second subcostal branch, vein 10, is emitted before the end of the cell, and in *Phyllocharis* after the end: *Midea*, for which he figured *M. scolymus*, is represented as agreeing with *Euchloë* with vein 10 before the end of the cell,—a character varying considerably on opposite wings of the same individual, although I believe vein 10 in *Euchloë scolymus* is never emitted after the end of the cell.

In June of the present year, Dr. Beutenmüller published a 'Revision of the species of *Euchloë* inhabiting America, North of

Mexico,' in which he very correctly stated that "the venation is subject to variation"; nevertheless he took the trouble to give the following nerve-characters for the groups:—

Euchloë, Hübner (=*Anthocharis*, Schatz).—Fore wings with 12 veins; veins 6–9 on a short stalk, sometimes with vein 6 free.

Anthocharis, Boisd. (=*Phyllocharis*, Schatz).—Fore wings with 12 veins; veins 6–9 on a long stalk, sometimes with vein 10 also on a stalk.

Midea (Herrich-Schäffer, not Schatz).—Fore wings with 11 veins; veins 6–8 on a stalk; vein 9 absent.

Now if these characters were constant, there would be no reason whatever why the three named groups should not stand as distinct genera; but unhappily they are by no means constant, as I shall now proceed to show.

In the wet season form of *E. sara* (the typical form) there are almost invariably 12 veins in the primaries, but we have one example in which vein 8 is absent. In our examples of the dry phase there are 12 veins, but we have three examples of an insect which might easily be recognized for the same thing from Vancouver, all of which have apparently lost vein 9. Our examples of what I believe to be *E. thoosa* and *stella* all have 12 veins, but five examples of *E. julia* from south-west Colorado and Arizona have apparently lost vein 9.

It would have seemed advisable to distinguish the Vancouver representative of *E. reakirti* by a separate name; only (unluckily for the species-maker) we possess a fourth example from the same collection in which 12 veins are present, but which, nevertheless, varies in another respect, vein 5 being emitted from 6, instead of from the cell.

Dr. Beutenmüller includes *E. cethura* and *E. pima* with *E. genutia* under *Midea* on the ground that they have only 11 veins to the primaries; but he seems to overlook a more important character which proves their close relationship to *Zegris*, *viz.* their extremely short antennæ. If *Zegris* is sufficiently distinct from this extremely variable genus to stand apart, in my opinion it has a greater claim upon *E. cethura* and *E. pima* than *Euchloë* has, in spite of the absence of that very uncertain little "vein 9."

Anthocharis of Beutenmüller = *Phyllocharis*, Schatz, is described by the later author as having 12 veins, veins 6–9 on a long stalk; but neither of these characters is constant, for whereas *E. hyantis* has an extremely short furcation of vein 7 (and consequently possesses 12 veins), the nearly related *E. venosa*, from Thibet, and *E. daphalis*, from north-west India, have only 11 veins, vein 9 being apparently absent.

Is vein 9 ever absent? In my opinion it is present throughout the genus; but veins 7 and 8, which are extremely variable in relation to the length of their furcation, are sometimes completely fused, or (as Sir George Hampson expresses it) coincident.

In one of our examples of *E. tagis* the length of the stalk bearing veins 6–9 is no longer than in typical *Euchloë*.

Schatz's definition of the supposed distinct genus *Phyllocharis* is no better than Beutenmüller's, for vein 10 varies in its position in individuals of the same species; sometimes, as in typical *Euchloë*, it is emitted before the end of the cell, sometimes at the end, and sometimes (as Beutenmüller points out) at some distance beyond the end.

Now, as regards *Midea*, Dr. Beutenmüller states that it has 11 veins, which is quite true of the type *M. genutia*, but Dr. Schatz figures it with 12 veins, which is equally correct as regards the Japanese species *M. scolymus*. If therefore *Midea* is retained, we must have a different name for *M. scolymus*; but surely in a genus like *Euchloë*, which is so utterly unstable and unreliable in its neuration, it is far better to recognize its transitional condition, and not distinguish genera whose evolution is incomplete.

A GUIDE TO THE STUDY OF BRITISH WATERBUGS (AQUATIC RHYNCHOTA).

By G. W. Kirkaldy.

(Continued from vol. xxxi. p. 206.)

The Rhynchota, or Hemiptera,* form, in some respects, the most isolated of the insect orders, and have no near allies, having evidently branched off from the primitive hexapod-line at a very early period. Taken as a whole, they are homogeneous, distinguished at once from all other Hexapoda by the structure of the mouth-organs, as well as by many other not superficially noticeable details. The Neuroptera are probably their nearest kin, although many authors have remarked upon the closeness of their relationship with the Coleoptera, an order with which in fact they are as remotely connected, perhaps, as with any other, though there is certainly a marked superficial resemblance, due, however, to their very similar habits in the imaginal stage. The average Rhynchoton is, in proportion to its size, rather heavily built, and adapted rather for crawling up a plant-stalk or along the leaf of a tree, remaining in one spot during a not inconsiderable period, than for prolonged aërial flights or hasty visits from flower to flower. These two orders—Rhynchota and Coleoptera—it may be remarked, are the only two in which a large number of species spend the greater portion of their imaginal existence under water.

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* Greek ῥυγχὸς (*rhunkhos*), a beak; ἡμι- (*hēmi-*), half; πτέρα (*ptera*), wings.

Omitting the parasitic group and, perhaps, the remarkable Coccidæ (scale insects), the Rhynchota comprehend two well-marked suborders—viz.: the HETEROPTERA and the HOMOPTERA. The former, containing the aquatic forms, are distinguished by the fact that the *genæ* (cheeks) are not contiguous with the anterior coxæ, as they are in the Homoptera; in the former, moreover, the elytra (upper pair of flight-organs) are usually coriaceous, except a small apical membranous portion, the "membrane," while they are more or less uniform in texture in the Homoptera.*

The study of the Heteroptera, or "BUGS" *par excellence*, has, in comparison with that of certain other insect groups, been unjustly neglected; owing doubtless to the disagreeable associations connected with the popular name, and apparently also to an unformulated impression, current even amongst many entomologists, that they are, in their structure and habits, somewhat uninteresting. How absolutely alien to the truth is this supposition would be apparent to anyone who spent an hour in a preliminary study of some of their characteristics. It is obvious that the harmoniously-arranged tints of certain Lepidoptera or the gaudy patterns of others are not possessed by, and would indeed be deleterious to, the aquatic forms we are now considering, but in extraordinary structures specially adapted to their environment, such as the method of respiration in *Nepa* and *Notonecta*, and the remarkable modifications of the 8th pleura, in the former, into a long respiratory tube; the structure of the antennæ in the Cryptocerata; stridulation in *Corixa* and *Micronecta*; to mention but a few of the most salient—the Rhynchota certainly far surpass their more admired rivals.

The peculiar odour, which in some terrestrial species is of an agreeable nature, in others so disgusting, is by no means highly developed in the aquatic forms. So far as I am aware, no external opening of the glandular apparatus has yet been discovered in any of them, although the existence of repugnatorial glands has been proved in some at least. *Notonecta* possesses perhaps the most distinctive odour, which has been compared by Dufour, somewhat exaggeratedly, to that of the plant *Chenopodium vulvarium* (*olidum*), or "stinking Goose-foot," but its tenacity is no way to be compared with that of the effluvium emitted, for example, by the Coleopteron *Gyrinus*.

Presuming that my readers wish to STUDY the Aquatic Rhynchota of these islands, and that their whole aim is not merely to be able to identify their captures—after a fashion, I propose first of all to offer a few remarks upon three specially interesting portions of the external structure—viz.: the rostrum, the antennæ, and the legs.

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* ἕτερος (*heteros*), other; ὅμος (*hŏmos*), similar.

THE ROSTRUM.

Although greatly modified, all the principal parts of the mouth, present in the Mandibulate Hexapoda, can be traced in the Rhynchota.

The upper lip (*Labrum*) is usually very short and more or less triangular in form, covering the base of the labium. The lower lip (*Labium, Second Maxillæ*, &c.) forms an elongate, subcylindric tube (consisting normally of four segments) which acts as a kind of suction-pump for the conveyance of nourishment to the digestive apparatus; it also serves as a sheath and support for the four sharp, thread-like setæ which represent the first maxillæ (*interior setæ*) and the mandibles (*exterior setæ*). These parts are apparently always present, but their appendages are very obscure, and specialists are by no means agreed on the subject.*

The general impression as to the method of feeding employed by Rhynchota appears to be that the "rostrum" (i.e. the labium) is thrust into the food-substance—animal or vegetable—the surface of which is penetrated by the thrust of the rostrum. On examining the latter, however, we find that the apex is usually blunt or slightly concave, clothed with hairs or bristles, and quite incapable of piercing the epidermis of an insect or plant. In reality, the desired surface is punctured by the long, acute, often serrated, mandibular setæ (which, as remarked previously, are, at rest, concealed in the labium), and the apex of the labium is then applied *immediately* (rarely pushed well in), and the contents of the food-substance pumped up.† The blunter and shorter maxillary setæ apparently serve for the conduction of saliva.

THE ANTENNÆ.

Four segments appear to be the normal composition of the antennæ, though *Hebrus* possesses 5, with one or two intercalated nodes, and in *Micronecta* and the Nepidæ there are apparently only 3. In the Hebridæ and Gerridæ they are long, free, more or less thread-shaped (*filiform*), the apical segment often swollen and furnished with thick hairs. In *Aphelocheirus* they are subcylindric, long and slender (the apical segment rather long), and,

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* For the latest papers, see Leon's "Beiträge zur Kenntn. der Mundteile des Hemipteren," Jena, 1887; the same author's "Labialtaster bei Hemipt." (1892, 'Zool. Anzeig.' pp. 145–7), and "Beiträge zur Kenntn. des Labiums der Hydrocoren" (1897, 'Zool. Anz.' pp. 73–7); in the latter the mouth-parts of *Gerris najas* and an extra-British species of *Velia* are figured. See also a preliminary paper by Heymons, "Die Mundteile der Rhynchota" (1896, 'Entom. Nachr.' xxii. pp. 173–5).

† I think the first author to call attention to this was Marlatt: see "The Hemipterous Mouth" ('Trans. Ent. Soc. Wash.' iii. pp. 241–9); "How Hemiptera Feed" (1895, 'Insect Life,' vii. pp. 427, 428); and "The Periodical Cicada" (1898, 'Bull. U.S. Agric.,' new series 14, pp. 52, 53).

though much shorter than is usual in the Gymnocerata* (to which *Hebrus* and the Gerridæ belong), they are not concealed in a groove (*fovea*) on the under side of the head, thus forming an exception to the general rule among the Cryptocerata. In *Ilyocoris* (= *Naucoris*, Saund.) they are somewhat similar to *Aphelocheirus*, but shorter and rather thicker, and the apical segment is very short. In the Nepidæ they are very small, so much so that Geoffroy, one of the earliest Linnean writers, made the mistake of supposing the raptorial anterior legs to be the antennæ. In *Nepa* the penultimate segment is laterally produced, on one side only, like a pickaxe, the apical segment being produced, on the same side, in a very similar manner. The foveæ, in this genus, are vaulted, probably forming an auditory chamber for the increase of sound-perception. With a slight difference in detail, the antennæ of *Ranatra* are very similar to those of *Nepa*. In *Corixa* the antennæ are subcylindric, the fourth segment being short and very thin; in *Micronecta* the last segment is spindle-shaped, concave beneath. In *Plea* the third segment is spindle-shaped and convex, the fourth being very small and thicker at the apex than at the base, arising *below* the apex of the third. In this genus the antennæ are clothed with sparse hairs near the apex of each joint. In *Notonecta* the first segment is very short; the second is subcylindric, thick; the third is smaller and slenderer, shaped somewhat like the blade of a knife; the fourth smaller and shorter still, but formed like the third. The third segment is furnished with half a dozen or more long clubbed hairs. It is probable that the antennæ, in the Cryptocerata at least, are very largely auditory and, to a much less degree, tactile organs. Those of the Cryptocerata are figured in Fieber's 'Genera Hydrocoridum' (1851, Abhandl. böhm. Gesellsch. Wissensch. (v.), 7, pp. 183–210, Plates 1, 3, & 4).

The Legs.

In all the aquatic forms, both gymnoceratous and cryptoceratous (with the possible exception of the Corixidæ), the anterior legs are raptorial. In all the femora are dilated—in some moderately, in others enormously. In the Hebridæ and Gerridæ there is little modification, except that in *Gerris*, *Hydroessa* (= *Microvelia*), and *Velia* the claws are inserted, as also in the posterior pairs, in a cleft below the apex.†

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* γυμνὸς (*gumnos*), naked, i.e. "not concealed," and ϰεϱαία (*keraia*), antenna; ϰϱυπτὸς (*kruptos*), concealed.

† Most authors speak of the claws being "ante-apical" or "inserted above the apex." I regret that I cannot conceive of the claws being inserted *above* the apex! As will be noted further on, the genera with subapical claws form the genuine Gerridæ; the others—viz. *Aëpophilus*, *Hydrometra*, *Mesovelia*—are probably more nearly allied to *Hebrus*.

In *Aphelocheirus*, *Plea*, and *Notonecta* the structure is fairly simple, and two claws are present in each tarsus, inserted at the apex. In *Ilyocoris* the femur is enormously dilated, forming an irregularly equilateral triangle; the tibia is slender, and fits at rest into a groove (*sulcus*) on the ventral surface of the femur; the tarsus is minute, composed of only one segment without claws. In *Nepa* the tibia is much longer, and fits into a similarly placed groove in the femur, the latter being slenderer and longer than in *Ilyocoris*. In the former there is also only one segment in the tarsus, which is minutely falcate at the apex, but there are no claws. In *Ranatra* the coxæ are very long, and were formerly often mistaken for the femora, which are rather longer and [in the British species *R. linearis* (Linn.)] are armed, about a third of the entire length from the apex, with a stout triangular spur; the tibia and tarsus are short, folding in close to the femur and locked by the femoral spur; there is only one segment in the tarsus, which is not provided with claws. The anterior legs in *Corixa* and *Micronecta* are exceedingly curiously formed, being more or less spoon-shaped. They will be discussed in detail later.

The posterior legs are those principally employed for locomotion. In *Hydrometra* and *Gerris* they are enormously long and very slender; in the other genera they are usually of medium length and thickness, more or less ambulatory. In *Corixa*, *Micronecta*, and especially *Notonecta* they have well-developed natatory powers. Claws are present in the Gymnocerata, Nepidæ, Naucoridæ, and *Plea*. The intermediate pair of limbs appear to be partly employed for progression, though in *Corixa* and *Notonecta* they certainly act as balancers. In the Gymnocerata, Nepidæ, Naucoridæ, and *Plea* they are not very dissimilar to the posterior pair; in the others they are long and slender. Claws are present in all.

I now purpose to deal systematically with the aquatic forms, discussing any special points of structural interest, and mentioning such of the habits, &c., as have been recorded, confirming or extending these as far as possible from my own observations.

HEBRUS. This genus, the systematic position of which is still doubtful, is readily distinguished from *Hydroessa* (=*Microvelia*), which is superficially similar, by the five-segmented antennæ,* and by the shape of the pronotum. The two British species may be found amongst *Lemna* and *Sphagnum* in marshy ground, but, as far as I am aware, no detailed observations of their habits have been published. *H. pusillus*, Fallén, which seems to be always macropterous, is figured by Douglas and Scott and by

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* The presence of five distinct antennal segments is not a family character, as the extra-British genus *Merragata*, F. B. White, possesses only four. The extra two or three segments in *Hebrus*, enumerated by certain authors, are merely nodes.

Saunders (in the edition with coloured plates). It is a southern species, not having been recorded north of Birmingham. *H. ruficeps*, Thoms., is usually brachypterous, and is widely though locally distributed—viz.: Perthshire, Essex, Surrey, &c. It has not been figured.

Aëpophilus bonnairei, Signoret, is another genus and species of doubtful position. It has lately been placed between *Acanthia* (=*Salda*) and *Ceratocombus*, but it may conveniently be considered here. It is always, so far as is known, brachypterous, having the general appearance of a narrow, rather plump, bedbug nymph (*Cimex lectularius*, Linn.). It is figured by Saunders. As numerous interesting accounts* of its habits have been so comparatively lately recorded in papers accessible to British students, it will be unnecessary to do more here than briefly summarise them. It may be looked for under embedded stones and fragments of rock, or indeed under starfish (sec. Marquand), or any object affording good cover on the seashore near the lowest tide-limit. The mature insect has been encountered from February to August, and is probably to be found all the year round. The records of capture are from Polperro, Penzance, Plymouth, Lyme Regis, Isle of Wight; and near Waterford, Ireland. It has derived its generic name from the fact that it is often found in company with the remarkable Coleopteron *Aëpus*.

(To be continued.)

MEDITERRANEAN LEPIDOPTERA.

By Philip de la Garde, R.N., F.E.S.

With reference to the notes by Mr. Gervase F. Mathew on "Lepidoptera from the Mediterranean" (Entom. 1898, pp. 77–84, 108–116, and 141), I should like to add the names of some species found by me in three of the localities he mentions—*viz.* Malta, Corfu, and Trieste; in each case at a different time of the year from that at which he visited them.

Malta.—The dates accompanying the following species show when they were first obtained:—*Lasiocampa* (*Bombyx*) *quercus* var. *sicula*, emerged in July; *Triphæna pronuba*, May 9th; *Aspilates citraria*, April 12th; *Acidalia asellaria*, March 28th; *Cornifrons ulceratalis* var. March; *Aglossa pinguinalis*, March 28th; *Pyralis farinalis*, May 9th; *Sphaleroptera ictericana*, April.

P. 82.—*Cœnonympha pamphilus* I saw first on March 18th, and *Deilephila euphorbiæ* emerged from chrysalis early in August.

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* See Marquand in 'Ent. Mo. Mag.' 1887, xxiii. p. 169; and Keys in the same Magazine, 1895, xxxi. p. 135; and 1890, xxv. p. 247.

P. 83.—There is a notation, "*Deiopeia pulchella*, not common." On May 9th there were large numbers on the wing, as far as I can remember, up a wied at the back of St. George's Bay.

P. 84.—*Plusia gamma* I first saw on March 10th, and *Botys ferrugalis* on 18th of that month.

Corfu.—Of the species mentioned on pp. 111 and 112, *Pieris daplidice*, *Lycæna telicanus*, *Limenitis camilla*, *Melitæa didyma*, *Hipparchia* (*Satyrus*) *semele*, *Satyrus* (*Pararge*) *roxelana*, and *Epinephele hispulla*, were taken by me between May 22nd and 27th. *Vanessa egea* I did not get till returning on July 6th. The additions from May 22nd to 27th show as—*Melanargia larissa* var., *Cœnonympha pamphilus* var. *lyllus*, *Vanessa atalanta*, *Lycæna icarus*, *Strymon w-album*, *Thymelicus actæon*, *Pamphila sylvanus*, *Arctia villica*, *Euchelia jacobææ*, *Zygæna punctum*, *Z. filipendulæ*, *Plusia gamma*, *Acontia luctuosa*, *Acidalia aversata*, *A. imitaria*, *Duponchelia fovealis*, *Pyralis farinalis*, *Pyrausta purpuralis*, *Stenopteryx hybridalis*, *Sphaleroptera ictericana*; and on July 6th, *Vanessa c-album*.

The King's Park, to which one is admitted free, is an ideal place for a day's collecting; gardens, plantations, and grass land being in abundance, while on the sea face the cliffs afford good rough scrub, which I should imagine, especially for a coleopterist, would well repay careful search. Being quite a beginner, I did not appreciate all the possibilities of the place, I am sorry to say, or undoubtedly I should have made a big haul. There is one little piece of advice I would give to anyone going to the King's Park while the syringa bushes are in bloom, and that is, "Dont hang about them too long, as their effect is much like hay fever."

Trieste.—I think the hill-side Mr. Mathew speaks of, on p. 114, must have been the same one I explored on June 11th and 13th, three months earlier in the year than he was there; the results as shown by the list were much better.

Navarino, at the beginning of July, was, like most places on the coast of Greece, quite burnt up, but some large flats up the bay should be happy hunting grounds earlier in the year; as it was, I got twenty-six species, as shown in the list.

From the way Mr. Mathew speaks of his stay at Venice, I fancy he must have been lucky enough to be in a ship that was able to go up the canal and anchor off the city, instead of remaining outside, as we had to do in the 'Victoria' in June, 1891, whence communication with the city was only once a day by torpedo boat. Still, "it is an ill wind, &c.," so I was able to land on the vegetated sandbank that forms Malamocco, and get a few species.

Pola, being purely a naval port, our wanderings were very much limited, nobody being allowed to go near any of the forts with which the sides of the harbour bristle, though the surroundings looked enticing.

Fiume, I was only able to land at for a very short time, but a climb over the hills at the back of the town is well repaid by the fine masses of scrub and wood beyond.

Cattaro, I should imagine, would be a grand ground, and I put down my poor catch on the day I landed to a heavy thunderstorm covering the hills which ring the harbour, the resultant temperature (94° in the shade at 4. p.m) having apparently as much effect on insect life as it had on me!

Appended is a list of the Lepidoptera I obtained, showing the different localities, but no attempt is made to arrange it in scientific order. My thanks are due to Mr. W. F. Kirby for nearly all the identifications.

Papilio machaon. Malta; Navarino.
P. podalirius. Navarino; Marmarice.
Pieris daplidice. Malamocco; Corfu; Navarino; Jaffa.
P. brassicæ. Malta; Spezia; Fiume; Corfu; Navarino.
P. rapæ. Malta; Spezia; Malamocco; Navarino; Jaffa.
Melanargia procida. Civita Vecchia; Trieste; Zara.
M. larissa. Corfu (var.).
Colias edusa. Spezia; Navarino.
C. hyale. Trieste; Zara.
Leucophasia sinapis. Civita Vecchia.
L. æstiva. Navarino; Nauplia.
L. erysime. Spezia; Trieste; Nauplia.
Aporia cratægi. Trieste; Pola.
Gonepteryx rhamni. Zara; Navarino.
G. cleopatra. Navarino.
Epinephele hispulla. Malta; Spezia; Corfu; Navarino; Limassol.
E. nurag (?). Spezia.
E. ida. Zara; Spalato.
E. lupinus. Navarino: Nauplia.
Hipparchia fatua. Navarino; Nauplia; Marmarice.
H. allionia. Spezia; Marmarice.
H. briseis. Spezia; Zara (var.).
H. semele. Corfu.
H. fagi. Trieste; Fiume; Cattaro.
H. proserpina. Rosas Bay; Fiume.
H. actæa. Fiume (var.).
Satyrus roxelana. Corfu.
S. adrasta. Trieste; Pola; Fiume.
Cœnonympha pamphilus. Malta (and var. *lyllus*): Spezia (and var. *lyllus*); Malamocco (and var. *lyllus*); Corfu (var. *lyllus*); Navarino; Nauplia.
C. arcania. Spezia; Trieste (var.),
Pararge megæra. Malta; Malamocco; Navarino.
P. egeria. Rosas Bay; Cattaro (var.); Navarino (var.).
Limenitis camilla. Corfu; Marmarice.
Melitæa didyma. Zara; Spalato; Corfu; Navarino.
M. athalia. Trieste; Fiume.
M. phœbe. Trieste.
M. ætheria. Trieste.
M. alpina. Zara.
Argynnis dia. Spezia.
A. cleodippe. Pola.
A. adippe. Fiume.
A. daphne. Trieste.
A. ino. Fiume.
Pyrameis cardui. Spezia; Spalato; Corfu; Navarino.
Vanessa atalanta. Corfu.
V. polychloros. Pola.
V. egea. Fiume; Spalato; Corfu.
V. c-album. Corfu.
Chrysophanus phlæas. Malta (var. *eleus*); Pola; Navarino (var. *eleus*); Marmarice (var. *eleus*).
C. thersamon. Jaffa.
Lycæna bætica. Marmarice.
L. argiolus. Navarino; Nauplia.
L. telicanus. Spezia; Corfu; Navarino; Nauplia.

L. icarus. Malta; Spezia; Malamocco; Cattaro; Corfu; Navarino; Nauplia.
L. astrarche. Malamocco; Spalato.
L. ægon. Trieste; Pola.
L. adonis. Trieste.
L. alcon. Trieste.
L. battus. Cattaro.
Strymon w-album. Corfu.
S. spini. Pola; Fiume; Zara.
Thecla ilicis. Trieste.
T. rubi. Trieste.
T. acaciæ. Pola.
Spilothyrus marrubii. Navarino; Marmarice; Limassol.
S. altheæ. Malamocco.
Pamphila nostrodamus. Navarino.
P. comma. Spezia.
P. sylvanus. Malamocco; Corfu.
Thanaos tages. Spezia.
Thymelicus actæon. Zara; Cattaro; Corfu.
T. lineola. Zara.
Hesperia cynaræ. Trieste.
Acherontia atropos. Stamphalia.
Chærocampa celerio. Nauplia.
Deilephila euphorbiæ. Malta.
Macroglossa stellatarum. Malta; Navarino.
Zygæna erythrus. Civita Vecchia.
Z. graslini. Civita Vecchia.
Z. punctum. Corfu.
Z. filipendulæ. Corfu.
Z. transalpina. Malamocco (var.).
Z. hedysari. Malamocco; Zara.
Z. coronillæ. Cattaro.
Z. ochsenheimeri. Zara.
Syntomis phegea. Trieste.
Callimorpha hera. Marmarice.
Callarctia pudica. Malta.
Arctia villica. Corfu.
Euchelia jacobææ. Corfu.
Deiopeia pulchella. Malta; Rosas Bay.
Clisiocampa castrensis. Civita Vecchia.
Lasiocampa sicula. Malta.
L. quercus. Malta.
Porthetria dispar. Port Mahon.
Plusia gamma. Malta; Corfu.
Synthymia monogramma. Malta.
Triphæna pronuba. Malta.
Acontia luctuosa. Corfu.
A. solaris. Malamocco.
Agrophila sulphurilis. Malamocco.
Euclidia glyphica. Malamocco.
Leucanitis stolida. Pola.
Calocampa exoleta. Malta.
Aspilates citraria. Malta.
Camptogramma bilineata. Marmarice (var. *testaceolata*).
Fidonia atomaria. Spezia; Trieste.
Rhodostrophia vibicaria. Trieste; Fiume.
R. calabraria. Trieste.
Acidalia ornata. Malamocco; Nauplia.
A. asellaria. Malta?.
A. aversata. Corfu.
A. imitaria. Corfu.
A. ochrata. Malamocco.
A. (*Idæa*) *rufaria.* Spalato.
Eubolia plumbaria. Trieste.
E. sp. Malta.
Venusia sp. Malta.
Pseudoterpna cytisaria. Trieste.
Aplasta ononaria. Trieste.
Boarmia rhomboidaria. Pola.
Cornifrons ulceratalis. Malta (var.).
Botys ferrugalis. Malta (var. *sphyrus*).
B. cinctalis. Malamocco.
B. nubilalis. Malamocco; Trieste.
B. fulvalis. Pola.
Aglossa pinguinalis. Malta.
Pyralis farinalis. Malta; Corfu.
Duponchelia fovealis. Corfu.
Pyrausta purpuralis. Corfu.
Stenopteryx hybridalis. Trieste; Corfu.
Pionea margaritalis. Malamocco.
Diasemia literalis. Malamocco.
Eletheia carnella. Trieste.
Ebulea verbascalis. Trieste.
Margaronia unionalis. Navarino.
Mecyna polygonalis. Navarino (var.).
Sphaleroptera ictericana. Malta; Corfu.
Aciptilia pentadactyla. Trieste.

H.M.S. 'Waterwitch,' Wei-hai-wei: Sept. 24th, 1898.

TWO NEW GENERA OF LECANIINE COCCIDÆ.

By T. D. A. Cockerell, N. M. Agr. Exp. Sta.

Platinglisia, n. g.

♀. Scale differs from *Inglisia* in being quite flat, circular; with the glassy covering in two parts, divided longitudinally in the middle line; antennæ and legs absent. Type, *P. noacki.*

Platinglisia noacki, n. sp.

♀. Flat, circular, 6½ mm. diam., reddish brown, with the marginal areas pallid; glassy covering transparent, with the two halves each having weak but easily visible concentric and radiating striæ, surrounding and arising from a centre a little to one side of the middle line of the insect. Under a microscope the glassy covering shows lines of air-cells as in *Inglisia*, and irregularly placed larger air-cells in the submarginal area. The insect has a deep longitudinal dorsal groove, thickly beset with small gland pores, and ending at the anal plates. This coincides with the suture between the glassy plates. The very small mouth-parts, with very short rostral filaments, are to one side of this groove, about the middle of the insect. The skin after boiling remains yellowish brown, except a sharply differentiated colourless marginal area; the brown area presents groups of irregularly formed gland-pits, the marginal area rather large round gland-pits. Extreme margin dark brown, with few short simple spines. There is a little white secretion in the spiracular regions, which remains as lines on the leaf when the scale is removed.

Hab. Campinas, Brazil, on the upper side of leaves of a myrtaceous tree or shrub (*Dr. F. Noack*, No. 83). This is a most remarkable Coccid, closely allied to *Inglisia*, but quite worthy of generic distinction.

Carpochloroides, n. g.

♀. Globose, without legs or antennæ. Larva of the Eriococcine type, with numerous spines, and a comparatively short terminal segment to the antennæ. ♂ sac white, composed of cotton-like threads.

Carpochloroides viridis, n. sp.

♀. *Adult.* A globular sac, becoming transparent, but still more or less greenish, after boiling; no segmentation visible; mouth-parts well developed and large, the rostral sheath very dark brown, ribbon-like; skin without spines, except a very few minute simple ones at the sides; legs and antennæ wanting; anal ring not observed, it must be very small.

Larva, just hatched. Fusiform, not very elongate; each segment bearing numerous long spines arranged in a transverse row, which is interrupted dorsally, and again subdorsally, four spines being on each side between the dorsal and subdorsal gaps; antennæ 6-segmented; 3 and 6 about equal, and longest, 1 and 2 next longest, then 4 and 5 hardly shorter; 6 is a little shorter than 4 and 5 together, and bears some very long hairs. Caudal setæ rather long. Legs well developed, digitules filiform, distinctly knobbed.

♂ sac white, elongate, of loosely woven cottony filaments, as in the Dactylopiinæ; length slightly over 2 mm. The ♂ sacs occur on the upper side of the leaves.

♂. *Adult.* Thorax brownish yellow, abdomen clear light lemon-yellow: length of the body about ¾ mm.; wings very large and ample, length almost 1½ mm.; two very long white caudal filaments, about 1⅓ mm. long; genital spike pyramidal, not very much longer than broad (instead of being greatly elongated as in *Capulinia jaboticabæ*); thorax much broader than abdomen; femur stout; tibiæ slender, enlarged at end, longer than femur, with a stout terminal spine; tarsus short, about one-third the length of tibia, with a long slender claw. The ♂ is described from specimens in the sacs, which were just ready to emerge.

Hab. On *Eugenia* sp., Campinas, Brazil, September, 1898 (*Dr. F. Noack*, No. 84). Dr. Noack writes that the adult females, as seen alive, are clear green, in form and colour very much like the young fruit of the *Eugenia.* The specimens arrived (in a letter) squashed flat, and in that condition I could not tell the females from the fruits. I boiled up several of the green objects, and found I had some of the coccids among them; the liquid was stained a deep gamboge-yellow, I suppose by the fruits.

This new genus is allied to *Capulinia* and *Cylindrococcus.* The larva resembles that of *Cylindrococcus* (*Crocidocysta*), but that has only two spines on each side of the dorsal line, where our insect has four; the antennæ also differ. It is to be noted that *Cylindrococcus* (type *C. casuarinæ*) and *Carpochloroides* have typically Eriococcine larvæ, *i.e.* with dorsal spines and a comparatively short terminal antennal segment. On the other hand, true *Sphærococcus* (type *S. casuarinæ*) has a typically Dactylopiine larva, with no dorsal spines and a long terminal antennal segment. So also has *Chætococcus bambusæ* a Dactylopiine larva, without dorsal spines; and the last antennal segment in this species is considerably longer than 4 and 5 together, while the others are subequal, 3 however being decidedly shorter than 2. *Antonina* also appears to be a Dactylopiine.

Note.—In my article on Sandwich Island Coccidæ (vol. xxxi. pp. 239, 240) *Aspidiotis* is misprinted all through "*Aspidistus.*"

Mesilla Park, New Mexico, U.S.A.: Oct. 29th, 1898.

NOTES ON THE NOMENCLATURE OF SOME HYMENOPTERA.

By T. D. A. Cockerell, N. M. Agr. Exp. Sta.

Pseudosphex and *Neosphex*.

The genus (or subgenus of *Sphex*) called *Pseudosphex* by Taschenberg (1869) cannot bear that name, on account of the lepidopterous *Pseudosphex*, Hbn. (1818), which Mr. W. F. Kirby treats as a good genus. According to Kohl, *Neosphex*, Reed, 1894, is the same as *Pseudosphex*, Tasch., so it is not necessary to propose a new name.

Gundlachia.

The name *Gundlachia* properly belongs to a genus of Mollusca, described by Pfeiffer in 1849.

Gundlachia, Herr.-Schäff., 1866, applied to a Trichurine moth from Cuba, will stand as *Burtia*, Grote; the only species will be *Burtia cruenta* (Herr.-Sch.).

Gundlachia, Cresson, Proc. Ent. Soc. Phila. 1865, p. 194, proposed for the peculiar Cuban bee, *Centris* (?) *cornuta*, Cresson, may be changed to *Heterocentris*, nov. nom.

Megachile inermis.

This name was proposed by Provancher (Add. Faune Hym. p. 323) to replace his *simplex*, preoccupied by Smith. Dalla Torre's name *simplicissima* for the same insect is therefore needless. *M. inermis*, Radoszkowski, Hor. Soc. Ent. Ross. 1893, p. 47, from Transcaspia, requires a new name, and may be termed *M. mitis*, nov. nom.

Hylæus minutus, Fabr., 1798.

Fabricius, in 1804, referred this to *Prosopis*, and it has so stood ever since. From the description I have little doubt it is a male *Halictus*, but the name is preoccupied in that genus by *Halictus minutus* (Schr. 1781). As the Fabrician insect cannot well be recognized from the description, it is not worth while to propose another name for it.

Macgillivraya.

Mr. Ashmead (Canad. Entom. 1898, p. 257) proposes this name for a genus of sawflies. The name was used by Forbes in 1851 for a genus of Mollusca.

Eunomia.

Eunomia, Cresson, 1875, is perhaps only a subgenus of *Nomia*, Latr., 1805. Cresson's name, however, is preoccupied by *Eunomia*, Hbn., which Kirby treats as a valid genus. It may be called *Dieunomia*, nov. nom. The species are *D. heteropoda* (Say), *D. apacha* (Cress.), and *D. marginipennis* (Cress.).

Mesilla Park, New Mexico, U.S.A.: Dec. 4th, 1898.

NOTES AND OBSERVATIONS.

Generic Names.—At the present time we are passing through a transition period as regards the classification of Lepidoptera, but probably it will be many years hence before the matter is adjusted, in any comprehensive way, to the satisfaction of everyone. As regards the arrangement of genera or species in our collections, it is not perhaps of much importance, except to the owner himself, what system is adopted, or in what order the families follow each other. The chief point is that we know where to find a species when wanted. A matter which is a greater source of trouble, and causes no little confusion and some misunderstanding, is that in nomenclature various authors are being followed. It would be a great convenience if those of our correspondents who prefer to use the more recently introduced or revived generic names would also give the genus in which species previously stood. If, for example, *Aglais* is adopted for *urticæ*, it would not entail very much trouble to add *Vanessa* in brackets. A little uniformity in this respect would certainly be appreciated by the majority of the readers of the 'Entomologist.' The Editor is always pleased to make these additions, but unfortunately manuscript is sometimes so closely written that it is not possible to do so conveniently; the same remark applies also to those cases where generic names are omitted altogether.

Observations on Sphinx (Phlegethontius) convolvuli.—A female *S. convolvuli* was captured in a neighbour's garden on July 18th last, and brought to me. I induced it to deposit ova. On the 20th I had the satisfaction of finding twenty-five eggs on the food-plant supplied—*Convolvulus arvensis*, and eight more on the 21st. The moth died on the following day; its body was then opened, and some hundreds of eggs were found. In colour the eggs were bright emerald green, and much smaller than those of *S. ligustri*. The larvæ emerged on the 27th and 28th; these were whitish green; the anal horn was not curved, but erect, dull black, and rough. The first moult did not change appearance. After the second moult the ground colour was pale green with a dark green dorsal line, head and anal claspers greenish brown; so far no oblique stripes were visible. The next change produced two varieties; in one the ground colour was pale green with seven oblique whitish stripes bordered with a darker colour, anal horn black at its apex and base with a greenish band round the centre; the second variety had its head purplish brown, a broad dorsal line of the same colour inclining to green in the centre, spiracles and seven oblique stripes purple, claspers dark greenish brown, horn black. Fourth change, a broad dorsal line of dark grey minutely speckled with yellow; a yellow subdorsal line; below this a broad line of grey with stripes of yellow; spiracles bright red; claspers and under side dark grey; horn: tip black bordered with a yellow band and a second band of black, the base rufous. By the end of August about half the larvæ died, the remainder looking very unhealthy, caring little for the food offered. My brother having had much experience in rearing larvæ of British Sphingidæ, I gave them to his charge, unfortunately too late; however, he put the remaining larvæ on a living plant of *C. arvensis*, and succeeded in getting one to full size. Description:—Head yellow, with five black stripes; ground colour almost black; an indistinct yellow chain-like dorsal line; subdorsal and spiracular lines of the same colour; stripes and anal flap yellow; spiracles bright red; horn slightly curved, tip and base black, with a central band of rufous. I cannot see that the ova or larvæ at any age bear resemblance to those of *S. ligustri* in form, colour, or behaviour. Contrary to the larvæ of *ligustri*, *convolvuli*, on being touched, or even the food shaken, would turn the head sharply round until it met the last segment, and then dropped from the plant. I believe the larvæ may not be so uncommon as generally supposed, but somehow lepidopterists have failed to discover them in any quantities. The perfect insect has been very plentiful here this season. My brother and I have for many years tried to obtain ova from captive *S. convolvuli*, however, without success until the present season; this success, I think, is owing to procuring the female so early. We seldom get *S. convolvuli* until well on in August. Generally we open the dead bodies of this species, but rarely find ova.—ALFRED BRAZENOR; Brighton, Nov. 26th, 1898.

THE BASAL SPOT ON AMPHIDASYS BETULARIA.—I have a series of four bred specimens of the black variety, *doubledayaria*—three females and one male. The females have a distinct white spot at the bases of the upper wings. This spot is absent in the male. My series of the type *betularia* is a small one, but the foregoing observations would seem to apply, though not so clearly, to the typical insect as well. Has anyone previously noticed this, possibly sexual, distinction?—J. ARKLE; Chester.

FORFICULA LESNEI.—M. de Bormans, of Savoy, sends me the following notes on *F. lesnei* (Entom. xxxi. pp. 49, 273):—"Voici ce que dit M. Finot de cet insecte:—'Cette espèce a été trouvée sur les herbes et les buissons, en Septembre, à St. Arnoult et Bénerville, près de Trouville (Calvados; marais de Villers-sur-mer).' En révisant la collection Brisout de Barneville, j'y ai trouvé quatre exemplaires de *F. lesnei*, étiquetés: *F. pubescens*, et provenant de St. Germain-en-Laye, près de Paris. Parmi les nombreux individus ♂ que je possède de *F. pubescens* et *F. decipiens*, les uns (plus nombreux) ont les pointes (apex) de la pince séparées, d'autres les ont contigues, mais aucun ne présente les pointes entrecroisées. Régulièrement *F. lesnei* a 12 articles antennaires, *F. pubescens* 12, et *F. decipiens* 13."—W. J. LUCAS; 4, Minerva Road, Kingston-on-Thames.

THE INSECT "PROTECTION COMMITTEE."—As adverted to by Mr. Hodges (Entom. xxxi. 277), there has been a distinct falling off in the number of records of local or otherwise interesting species, not only during the past year but also in 1897. I am, however, inclined to believe that this regrettable state of affairs was the result of other causes than the action of the "Protection Committee." The laudable endeavour of the said Committee, acting under the auspices of the Entomological Society of London, to impress upon collectors the wisdom of exercising moderation in their drafts on colonies of special insects and those restricted to limited areas in this country, should not have deterred the practical entomologist from making known the results of his field-work. There does not appear to be any reason to suppose that the Committee had, or have, any intention of interfering with the legitimate pursuits of the collector. It is therefore to be hoped that entomologists who have the good fortune to obtain species that are at all above the common or garden kind will not refrain from publishing the fact for general information.—RICHARD SOUTH; 100, Ritherdon Road, Upper Tooting, S.W.

NOTE ON COSSUS LIGNIPERDA.—There is a fact in the life-history of *C. ligniperda* which is common in my experience, although it is only mentioned by one entomological work among those with which I am acquainted. The description, in brief, generally given in books is that the creature lives for four years in the larval stage, and that each winter the larva makes a cocoon of silk mixed with wood fragments, within the tree in which it resides, the final cocoon being placed in its tunnel near the exterior of the tree. The Rev. J. G. Wood, in 'Insects at Home,' mentions that in the 'Entomologist' for August, 1868 (iv. 121), Miss Newman records the finding of a cocoon of *C. ligniperda*, in April, in the middle of an arable field. The cocoon was made with earth instead of wood-chips. The moth emerged in the following June. It is my experience that it is quite common for the larvæ to bury themselves in the ground, both to pass the winter (when not full grown) and to pupate. For several years past no summer and autumn have gone by without some of these larvæ being brought to me by gardeners who have dug them up. They are also, here, very frequently found at the end of the summer, wandering across roads and gardens (presumably in search of suitable spots in which they may bury themselves). I may add that the majority of the larvæ thus found, and of those dug up, are full-fed. In no case have I found, or had brought to me, a very small larva.—ALBERT MAY; Hayling Island, Hants.

[There appears to be no doubt that larvæ of *C. ligniperda* do, perhaps not infrequently, leave their burrowings in trees and enter the earth to pupate. Newman (Entom. vi. 487), in reply to a question on the subject, states that he found a larva "under ground in a cocoon formed of silk and earth, without a particle of its home being made of sawdust." The matter again crops up in 1887 (Entom. xx. 231), when an example of *C. ligniperda* was seen to emerge from the surface of a lawn-tennis court, and, on a search being made, the pupa-case was found. Another correspondent, in the same volume (p. 274), remarks that although he had previously always found the cocoons in wood, he had that year "discovered the pupa-case at a considerable distance from the tree, just below the surface of the earth." Then, in 1892 (Entom. xxv. 46) there is a statement to the effect that a full-grown larva, which had been dug up in a garden, formed its cocoon of earth and bits of cork. Other instances might be quoted, but the foregoing sufficiently confirm Dr. May's observations. We may add that Wilson, in his 'Larva of British Lepidoptera,' published in 1880, states that caterpillars of *C. ligniperda* occasionally go under the surface of the earth to pupate; Barrett, in 'Lepidoptera of the

British Islands,' ii., refers to the wandering habit of the full-grown larva; and Tutt ('British Moths') leads us to suppose that pupation is always effected in the ground.—Ed.]

CAPTURES AND FIELD REPORTS.

Xylina furcifera near Brighton.—A perfect example of this species was taken near here at sugar by Mr. Alfred Giebeler, of Wilbury Road, Hove, on September 13th last. It is not a locality one would expect to find this species. All being well, the district will be thoroughly worked next season; then it will be interesting to find if this rare Noctua is actually established in the locality.—Alfred Brazenor; Brighton, Nov. 26th, 1898.

[Probably the first-known British examples of *Xylina furcifera* (= *conformis*) were the two specimens taken on ivy blossoms in October, 1859, near Cardiff, and exhibited at a meeting of the London Entomological Society in March, 1861. These were referred to in the 'Entomologist's Annual' for 1862, and a figure of the species given on the plate in that volume. Mr. T. H. Allis, in a note published in 1869 (Ent. Mo. Mag. v. 278), states that he had seen four or five British individuals of *X. conformis;* one of these, he says, "was taken near Halifax, in spring, many years since"; others were Welsh specimens, and had been received by entomological friends from the original captor. In 1869 (Ent. Mo. Mag. vi. 190) there is a record of two specimens taken in October at sugar in Monmouthshire. Two are mentioned as having been taken in November, 1870, but the locality is not given (Ent. Mo. Mag. vii. 188). In the spring of 1874 an example was found at rest on a birch trunk near Neath (Entom. vii. 260; Ent. Mo. Mag. x. 276).

The species was reared by Mr. W. Buckler in 1874 from eggs obtained from moths which had been captured in Wales in October, 1870, and kept in confinement during the winter. The larvæ began to hatch on April 17th, and were full grown about June 17th. The first imago emerged on August 7th, and the last ten days later (Ent. Mo. Mag. viii. 114). Mr. W. H. Tugwell, in 1880, bred eighteen moths from twenty eggs received from Glamorganshire (Entom. xiii. 242); and Mr. W. H. Grigg reared eight examples the same year from ten eggs that had been sent to him (Ent. Mo. Mag. xvii. 134). There were eight specimens in Machin's collection, which was sold at Stevens's in 1895, and these realised £3 7*s.*; while the sixteen examples in Wheeler's and Tugwell's sale made from 9*s.* to 12*s.* 6*d.* each.

It may be mentioned that *Xylina furcifera*, Hufn., is found in Central Europe, the Ural, and the Altai. *X. ingrica*, H.-S., which is probably only a form of *X. furcifera*, is confined to boreal and alpine localities, and is always scarce. *X.* (*Agrotis*) *ustulata*, Bull., is the Japanese representative, and *X. grisea*, Graeser, the Amurland form of *X. ingrica*.

Xylina lambda (= *zinckenii*) appears to be very rare in Britain. It was first brought forward by Dr. Knaggs in 1866, when he recorded a specimen from the neighbourhood of New Cross, where it was taken in the month of September of that year. Another example was announced from the Guildford district, and was obtained at sugar in October, 1866 (Ent. Mo. Mag. iii. 163, 208, 235). These specimens were also referred to by

Mr. Newman (Entom. iii. 203, 227) and by Dr. Knaggs in the 'Entomologist's Annual' for 1867 and 1868, a figure of the New Cross specimen being given in the volume for 1867. Mr. E. Hopley, in a communication to the 'Entomologist's Monthly Magazine,' 1869 (v. 252), states that an insect taken at rest on a poplar tree in the North of London in October, 1865, and which was considered to be a "strange example of *Acronycta psi*," turned out to be a specimen of *X. zinckenii*. In October, 1870, a specimen was captured at sugar in Darenth Wood (Ent. Mo. Mag. vii. 140).

At a meeting of the London Entomological Society, held in April, 1876, Mr. Bond exhibited a specimen which he stated had been taken near Erith in September, 1875; he also remarked that it was the fifth instance of the species having occurred in Britain (*vide* also Entom. ix. 191).

The most recent capture appears to be that of a specimen taken at sugar on September 30th, 1895, near Ipswich (Entom. xxix. 21).

There were two specimens in Fry's collection; these were stated to have been taken at "Rannorth," and were sold at Stevens's in March, 1896, at 12*s*. apiece.

This species is a native of Northern and Central Europe, but it is always scarce. The larva is said to feed on *Vaccinium uliginosum* and *Myrica gale*. *X. brachyptera*, Staud., from Amurland, is a very close ally.—Ed.]

Xylophasia monoglypha (polyodon) in November.—As evidencing the extreme mildness of the weather, I may mention that a freshly emerged male specimen of *X. monoglypha* was taken yesterday, Nov. 16th, in this house, by my mother. Is not this late appearance very unusual?—C. Granville Clutterbuck; 1, Spa Villas, Gloucester, Nov. 17th, 1898.

Captures in November.—At light, on Nov. 15th, I took four male *Asteroscopus sphinx* (*cassinea*), three male *Hybernia defoliaria*, and one male *Himera pennaria*; and on the 16th one male *A. sphinx* (which completely spoiled itself in the box in which it was being conveyed home), and two male *H. defoliaria*. On the 18th of the same month five male *A. sphinx* were found on the gas-lamps here, and two males and one female on the 19th; most of these specimens were inside the lamps, and very difficult to get at.—C. Granville Clutterbuck; Gloucester.

Cymatophora octogesima (ocularis).—On Dec. 18th I was fortunate in finding a pupa of *C. octogesima* at poplar here.—C. Granville Clutterbuck; Gloucester.

Phlogophora meticulosa in November.—With regard to your note respecting the occurrence of this species in November (Entom. xxxi. 293), I have not done much entomological work this autumn, but I examined some ivy in my garden here on Nov. 9th, 10th, 12th, 15th, and on each of those nights found specimens of *P. meticulosa* from two to eight in number.—Waldegrave.

Phlogophora meticulosa in November: Notes from the Chester District.—I took three specimens of *P. meticulosa* at the electric lamps here on Nov. 16th, and another on the 17th, all fine specimens, especially the last one. Other moths have been exceedingly few. One *Himera pennaria*, a female, was picked up, I think on the city walls in October; but this is the only representative I know, this season, of a species which seems to have been scarce since Nov. 8th, 1895, when I saw as many as six on one gas-lamp. I have seen very few *Hybernia defoliaria* and *Cheimatobia brumata* this autumn, and only one *Pœcilocampa populi*, which came to an electric lamp, Nov. 17th. A solitary *Scopelosoma satellitia*, Nov. 16th, completes my list up to date. (I see I omitted *Anchocelis lunosa* from my notes (Entom. xxxi. 298). Type and dark forms of this prettily marked moth were common at the lamps in September).—J. ARKLE; Chester.

LARVÆ OF PIERIS BRASSICÆ IN NOVEMBER.—On Nov. 17th I noticed that the cabbages in a garden near here were much eaten: upon closer observation, I found a number of larvæ of *Pieris brassicæ* upon them, just about full grown. Was it not very late in the year for these insects to be still in the larval stage?—F. D. BLAND; Llanrwst, N. Wales, Dec. 17th, 1898.

[For a still later date see Entom. xxix. 127.—ED.]

FORFICULA LESNEI AT COLCHESTER.—My son took three or four specimens of *F. lesnei* in the early part of the year, not very far from our house. Mr. Lucas's figure in the 'Entomologist' (xxxi. pl. i. fig. 1) enabled me to determine the species at once.—W. H. HARWOOD; Colchester, Dec. 17th.

NOTES ON THE LEPIDOPTERA OF CHISWICK AND THE NEIGHBOURHOOD, 1898.—During the last two seasons *Lycæna argiolus* has, I am glad to say, again occurred frequently, after having for many years previously been very scarce. *Leucoma salicis* seems to be very uncertain in its appearance in this part of the country. Though I had long before made its acquaintance in the south, I never saw it in this district till May 31st, 1892, when I found many larvæ on Lombardy poplars at Barnes. From these I bred seven moths. The next year it was scarce, and I do not remember to have seen the species since. The larvæ of *Acronycta aceris* have been unusually common this year. My wife brought me one from Hyde Park. These larvæ, when resting, as their habit is, in a curled position on the under side of a sycamore leaf, much resemble those light-brown patches so common on the leaves of this tree in early autumn. The reddish tufts of hair on the back of the larva serve to heighten this effect. On May 9th I found a fine specimen of *Cucullia chamomillæ* on a fence here, and another on May 23rd. The latter I set again at liberty, as it was rather worn. The only other specimen I have, I took here about 1870. Can anyone tell me how to find the handsome larva? as I should much like to rear this species.—ALFRED SICH; 65, Barrowgate Road, Chiswick.

NOTES FROM NORTH WALES.—In August, 1898, I spent a fortnight at Aber, North Wales, and did some collecting. Butterflies were not very plentiful owing to the prevalence of wind. Among those I noticed were the following:—*Pieris napi* (abundant, by far the commonest of the "whites"), *Vanessa urticæ*, *V. io*, *V. atalanta*, *V. cardui* (a few in fine condition), *Pararge megæra*, *Satyrus semele*, *Cænonympha pamphilus*, *Polyommatus phlæas*, *Thecla quercus*, *Lycæna icarus*. Moths were fairly plentiful on favourable nights. Odd specimens of *Hydræcia micacea*, *Neuronia popularis* (males only), *Amphipyra tragopogonis*, and *Abrostola triplasia* came to light. I also noticed the following moths at various times during my visit:—*Lithosia complana*, *Hepialus sylvanus*, *Axylia putris*, *Mania maura*, *Plusia gamma*, *Selenia illunaria*, *Larentia didymata* (very common), *Hypsipetes elutata*, *Melanthia bicolorata*, *Melanippe subtristata*, *M. fluctuata*, *Cidaria immanata*, *C. prunata*, and *Eubolia limitata*.—P. J. BARRAUD; Bushey Heath, Herts.

COLLECTING AT DEAL.—I spent five days towards the end of July this year at Deal, collecting Lepidoptera. The weather being fine and hot, insects were abundant, and amongst others I met with the following species:—*Nola centonalis*, one only on the night of July 24th; hard work on three subsequent nights failed to produce another specimen. *Porthesia chrysorrhœa*, two specimens at light, and several others found by searching bushes in the daytime on the sandhills; a small batch of ova was obtained, and the larvæ are now hybernating. This is not, I believe, usually considered a rare insect; but in the course of twenty-five years' collecting I have never before met with it. *Lithosia lutarella* (*pygmæola*), fairly abundant, and occurring over a large area on the sandhills. I saw it stated in the entomological journals, some years back, that this insect was likely to become extinct at Deal, and was very pleased therefore to find it still in existence and by no means rare. Amongst the Noctuæ, *Agrotis tritici* and *A. vestigialis* were abundant and in fine condition; so also was *Caradrina alsines*. *Hydrœcia nictitans* was just appearing; but *Xylophasia sublustris* and *Agrotis corticea* were scarce and probably getting over, as the specimens seen were all more or less worn. *Mesotype virgata* (*lineolata*) was plentiful in one or two places on the sandhills. *Crambus contaminellus*, not easily disturbed in the daytime; but at night by no means uncommon, a fine series being secured. On the marshes a few *Acidalia emutaria* were obtained during the day by beating the vegetation growing on the sides of the ditches. I was fortunate in obtaining ova, and have the larvæ now hybernating. My stay being so short gave me no time for night work on the marshes. There is no doubt but that our friends the golfers have done an immense amount of injury to the Deal sandhills from an entomological point of view, but fortunately their operations do not by any means cover the whole of the ground; and, judging merely from my limited experience, I do not see any reason why all, or nearly all, the Lepidoptera recorded from this locality should not still occur there, with the possible exception of *Acidalia ochrata*. I did not see a sign of this species, and very much fear that it is quite extinct there.—G. Harold Conquest; 58, Hatherley Road, Walthamstow, Dec. 12th, 1898.

Collecting at Bushey Heath, Herts, and Neighbourhood, in 1898.—The past season has been a very fair one for collecting Lepidoptera. Light was attractive during the greater part of the year, while hardly anything came to sugar until quite the latter part of the season. Sallow-hunting in the spring produced a fair number of species. In January and February I captured *Hybernia rupicapraria*, *H. leucophæaria*, *H. marginaria*, *H. defoliaria*, *Anisopteryx æscularia*, *Cheimatobia brumata*. *Larentia multistrigaria*, and *Phigalia pedaria* (*pilosaria*). Later, at sallows, I took *Tæniocampa gothica* (common), *T. instabilis*, *T. populeti* (one male), *T. stabilis* (abundant), *T. munda*, *T. cruda* (abundant), *Cerastis vaccinii* (few), *Scopelosoma satellitia* (few), and one *Brephos parthenias* flying in sunshine. In April I found the following species on palings, &c.:—*Xylocampa lithoriza* (common), *Amphidasys prodromaria* (*strataria*) (one female), *Larentia multistrigaria*, and a few *Anticlea badiata*. In May I netted *Hepialus lupulinus*, *Gonoptera libatrix*, *Drepana falcataria*, *Panagra petraria* (abundant), *Cabera exanthemata*, *Rumia cratægata*, and *Melanippe fluctuata*. The only captures at light in May were one *Cucullia verbasci* and one *Anticlea nigrofasciaria* (*derivata*). In this month I also found the following on palings, &c.:—*Tephrosia crepuscularia*, *Cilix spinula*, *Hemerophila abruptaria*, *Coremia designata*, *Selenia illunaria*, and *S. illustraria*. On Whit-Monday at Bricket Wood I captured *Argynnis euphrosyne*, *Go-*

nepteryx rhamni, *Cœnonympha pamphilus*, *Venilia macularia*, *Acidalia remutaria*, and *Ematurga atomaria*; and in June I took twenty-one species, including *Sesia tipuliformis*, *Hecatera serena*, *Aplecta tincta* (one on palings), *Euclidia mi*, and *Cidaria russata*. In July light was very attractive. Among those I took were the following:—*Chærocampa porcellus*, *Thyatira batis* (one, in fine condition, the first I have taken at light), *Bryophila perla* (common), *Orthosia upsilon*, *Abrostola urticæ*, *Plusia chrysitis*, *Eupithecia rectangulata*, *Hypsipetes elutata*, *Melanthia ocellata*, *Cidaria fulvata*, *C. dotata*, *C. associata*, and *Pelurga comitata*. Dusking resulted in the capture of *Chærocampa elpenor*, *Miana strigilis*, *Noctua augur*, *Plusia iota*. *Uropteryx sambucaria*, *Pericallia syringaria*, and others. Sugaring in July was most disappointing, the only capture being a single *Euplexia lucipara* on the 2nd. In September eighteen species were taken at sugar, the best being *Agrotis saucia*, *Xanthia citrago*, *X. gilvago*, *Polia flavicincta*, *Catocala nupta*, and *Thera variata*. One *Macroglossa stellatarum* was netted in the garden at dusk; and I also found *Ennomos angularia* and *E. tiliaria* at rest. In October *Anchocelis pistacina*, *Cerastis vaccinii*, *C. spadicea*, *Scopelosoma satellitia*, *Meselia oxyacanthæ*, *Phlogophora meticulosa* (any number) occurred at ivy, and *Oporabia dilutata* was common on fences. November proved an unproductive month. I took one *Hybernia defoliaria* at light; and *H. aurantiaria* (one only), *Oporabia dilutata*, and *Cheimatobia brumata* on palings. —P. J. Barraud; Bushey Heath, Herts.

Observations of Insects during the past Season.—On March 14th I noticed *Gonepteryx rhamni* in Somersetshire; but the month being somewhat cold I did not see it again until April, when it was fairly abundant locally. *Lycæna argiolus* appeared in same district on April 17th. Visiting South Wales in May, I found *Euchloë cardamines* on the 4th; it did not afterwards appear so abundant as in other years, the season being wet and cold at times; and yet on bright days *Lycæna argiolus* locally, however, appeared commonly. *Argynnis euphrosyne* was not so abundant as in some seasons. Vegetation at this time was much later than usual, the hawthorn not being in bloom until the end of the second week of May. In June the "whites," especially *Pieris brassicæ*, were more frequently seen than in the previous season. I did not try sugaring often, as moths appeared so sparingly. On June 22nd I noticed a female *E. cardamines* in Breconshire; and again a male was seen so late as July 5th in the same county. None of the Geometræ during June and July were at any time abundant. On August 15th I noticed several examples of that wanderer *Pieris napi* flying over the top of the Sugar Loaf Mountain. *Polyommatus phlœas* might then be seen frequently in that part of Wales; and *Vanessa io*, *V. atalanta*, and *G. rhamni* were then appearing. Wasps and their nests were also excessively common. On August 30th I noticed a single *Colias edusa* flying by the side of the railway near Taunton, Somerset, the only one seen during the season. During September in West Somerset the "whites" in some localities were very commonly seen; and I noticed several times single specimens of *Macroglossa stellatarum*—now at late blossoms of the heather, and then in gardens. I heard of *Sphinx convolvuli* being frequently seen in other parts of Somersetshire, and it also turned up in Gloucestershire. In October, with the exception of *Anchocelis pistacina* and *Phlogophora meticulosa*, moths were scarce the few times I was able to visit the ivy bloom, as wet weather set in. I find, in conclusion, that, with the exception of the insects before mentioned, it has not been a good season for Lepidoptera. I noticed very few examples of that often abundant and lively insect *Plusia gamma.*—T. B. JEFFERYS; Bath.

RECENT LITERATURE.

Handbook of Insects Injurious to Orchard and Bush Fruits, with Means of Prevention and Remedy. By ELEANOR A. ORMEROD. 8vo, pp. x, 286. London: Simpkin, Marshall, Hamilton, Kent & Co., Limited. 1898.

IN this volume, the most recent of Miss Ormerod's valuable contributions to the literature of economic entomology, all the most important information on the subject has been brought together and presented in a form that should be of great help to the fruit-grower.

The matter is arranged in accordance with the alphabetical sequence of the various fruits considered; thus, under the heading "Apple" there are accounts of American Blight (Woolly Aphis), *Schizoneura lanigera*, Apple Aphis (*Aphis mali*), Codlin Moth (*Carpocapsa pomonella*), Figure-of-8 Moth (*Diloba cæruleocephala*), Goat Moth (*Cossus ligniperda*), Lackey Moth (*Clisiocampa neustria*), Lappet Moth (*Gastropacha quercifolia*), Small Ermine Moth (*Hyponomeuta padellus*), Garden Chafer (*Phyllopertha horticola*), Apple Sawfly (*Hoplocampa testudinea*), Mussel Scale (*Mytilaspis pomorum*), Apple Chermes (*Psylla mali*), Apple-blossom Weevil (*Anthonomus pomorum*). In all cases the questions of prevention and remedy are fully treated, and figures of each "pest" in its mature and one or more of its earlier stages are given.

Referring to *Carpocapsa pomonella*, our author states that other orchar dfruits besides apples are liable to this infestation. "Pears are sometimes much injured; quince, plum, peach, and apricot are sometimes attacked; walnuts have been found infested; and this species has been recorded as having been bred frequently from sweet chestnuts. The method of infestation is for the moths to come out about the time of the opening of the apple blossoms, and when the petals have fallen and the embryo fruit is beginning to form, the females lay their eggs; formerly it was supposed especially at the eye or blossom end of the fruit, but according to recent observations it appears that the eggs may be attached anywhere,—to the surface of the fruit, or to its stem."

In the case of *Gastropacha quercifolia* Miss Ormerod says:—"The attack of the lappet caterpillars to orchard leafage has very rarely been reported as occurring to any injurious extent with us, and here, as well as on the Continent of Europe (where the attack is much more destructive), it is rather from the great size of the caterpillars than from their numbers that they are seriously mischievous."

The illustrations in the text, over sixty in number, are excellent, and there is a portrait of the author, reproduced from a photograph by Messrs. Elliott & Fry. We have very great pleasure in commending this handy manual not only to those for whom it has been especially prepared, but also to the student of general entomology.

Proceedings of the South London Entomological and Natural History Society for 1898. Part I. Pp. 32. Published at the Society's Rooms, Hibernia Chambers, S.E. November, 1898.

Contains the following papers read before the Society during the first half of the session:—1. "The Lasiocampids," by J. W. Tutt, F.E.S.; 2. "British Species of Lepidoptera occurring in Japan," by R. South; 3. "Notes on Collecting British Hemiptera," by Edward Saunders, F.L.S., F.E.S.; 4. "Notes on some South European Lepidoptera, with Remarks on *Thais* and *Euchloë*," by A. H. Jones, F.E.S.

In his contribution, Mr. Tutt has collected together a good deal of information concerning the natural history of the group of moths he refers to as Lasiocampids. He divides these into six tribes and nine genera. *Neustria* and *castrensis* are referred to *Malacosoma*, which, together with *Macrothylacia* (*Bombyx*) *rubi*, are placed in the fifth tribe. *Cosmotriche* is adopted for *potatoria*, *Gastropacha* for *quercifolia*, and *Phyllodesma* for *ilicifolia*, all three being comprised in tribe six, but the two last generic names are afterwards changed to *Eutricha* and *Epicnaptera* respectively.

The device usually employed to indicate the probable relationship of families and genera of Lepidoptera has here assumed the form of a veritable genealogical tree.

We note that the author says that he has "long come to the conclusion that synonymy is of the devil." Probably, however, it is easier to settle questions connected with the priority and significance of written names than it is to fix the order in which groups of living organisms were evolved.

Mr. Saunders's paper is a useful introduction to the collection and study of Hemiptera; and that by Mr. Jones is interesting, and embraces some instructive remarks on *Thais* and *Euchloë*.

Manchester Microscopical Society. Transactions and Annual Report, 1897. Pp. 114, with 8 photo plates. Manchester: published by the Society. July, 1898.

Among the contents are two entomological papers, one of which, by A. T. Gillanders, deals with "The Hemiptera-Homoptera," and the other, entitled "Natural Selection in the Lepidoptera," is by Mark L. Sykes. The latter discusses the question of "Mimicry," and is illustrated by eight excellent plates.

Marvels of Ant Life. By W. F. Kirby, F.L.S., F.E.S., &c. Pp. 174, illustrated. London: S. W. Partridge & Co. 1898.

A charming little book, teeming with interesting facts connected with the habits and natural economy of ants of all countries. Our author professes to have furnished us with a popular rather than a scientific work, but we find, nevertheless, that the information supplied is scientifically accurate and of a distinctly educational character.

THE ENTOMOLOGIST

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LEPIDOPTERA PHALÆNÆ OF THE WHOLE WORLD.*

We have here the first volume of a gigantic undertaking, which will mark a new era in the study of the Heterocera or, as we must now term them, the Lepidoptera Phalænæ. Though it professes to be a catalogue of specimens in the British Museum, we learn in the introduction that descriptions of all species hitherto described are included of which specimens are available for study, or about which sufficiently reliable information is published to enable them to be classified with approximate correctness, and lists of species of which the descriptions are insufficient will be given. No new species are described unless they are represented by specimens in the British Museum. In simple terms, the work is to include all known moths, and will enable any specimen to be at once named or shown to be a new species, a matter at present impossible without access to the best libraries and collections, and then only after a laborious search.

When we find that the present volume of 580 pages treats of only one family—viz., the Syntomidæ—and contains descriptions of 1184 species, some idea of the probable extent of the work may be formed.

The descriptions appear to be all drawn up by the author, usually with the type specimen before him. Here and there only are there any references to early stages, these appearing to be quite unknown in most species. The known larvæ of *Dysauxes punctata* and *ancilla* are not however referred to. A large number of new genera and species are defined. There is also an atlas of 17 coloured plates, with 466 figures, chiefly of species of which no reference to a good figure can be given, and there are 285 woodcuts in the text.

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* 'Catalogue of the Lepidoptera Phalænæ in the British Museum': Vol. I.—'Catalogue of the Syntomidæ in the Collection of the British Museum.' By Sir George F. Hampson, Bart. London: Printed by order of the Trustees. 1898. Pp. xxi, 559. Seventeen coloured plates.

As a descriptive catalogue the work seems to be eminently satisfactory, and the British Museum and the entomological public are to be congratulated that such an important undertaking should have fallen to so capable an author. In the larger genera many of the species seem closely allied, and our impression is confirmed that in some of these a recognition of geographical variation may diminish the number of separate species. This is a subject of which the study will be much facilitated by the present volume, when the long enough series and a knowledge of early stages are obtained.

The table of phylogeny of Syntomidæ is interesting, but we doubt whether anyone but the author possesses the knowledge necessary to intelligently consider it. We confess our inability to criticise it.

There is a short introduction giving some general information about early stages, structure, phylogeny, and geographical distribution. Possibly that dealing with phylogeny presents items of most general interest. To a descriptive catalogue like this, the phylogeny adopted is really of very little importance, as each volume will be complete in itself; but as a subject of general interest it is really what we are all working at, either as regards the relationship of orders and families, or, in closer detail, of species and varieties to each other. The views held by Sir George Hampson, who has a knowledge of the forms and structure of lepidopterous imagines that is perhaps unequalled, are, therefore, worth some study. A comparison of the table on p. 16, with that in the 'Moths of India,' vol. i. p. 8, 1892, shows what a great advance has been made in the last six years. So great in some respects are the differences, that an equal advance in the next six years will give us a tree that will be very near the truth.

Besides including the butterflies, the present table strikes us at once as rescuing the Syntomidæ from their traditional, but absurd, place beside the *Zygænas* (*Anthrocera*), and placing them with the Arctiadæ and Noctuidæ, brought from two different positions in the 1892 table. The Limacodidæ are brought into a less impossible place. The Pterophoridæ are in a conceivable position; and several other collocations are more in accordance with the positions suggested by other than the imaginal stage. There still remain several arrangements that are extremely doubtful. Of these the most pronounced is the place assigned to *Zygæna*. This is more satisfactorily placed in the 1892 table, as it is a terminal form. The highly specialised larva forbids its being an ancestor of many forms placed above it, though its imaginal and pupal states do not stand greatly in the way. For a Cossid or Psychid larva to be derived from a Zygænid one seems impossible. As positions that are not impossible, but very unlikely, the collocation of Sphingids and Cymatophorids seems open to question. We should remove the Cymatophorids to the Geometridæ, and both nearer the Pyralidæ. The rest of the flat-egged families on the Notodontid stirps should be brought to the Limacodid stem.

However, it is easier to criticise than to construct; and no phylogeny of Lepidoptera yet suggested has quite pleased anyone but the author, whom we may guess to be often as dissatisfied as anyone else. The materials are not yet nearly abundant enough. The 'Key' is a much better one than in the 'Moths of India,' being founded for the most part on significant characters, or rather these are taken more in order of their importance, giving a more natural result. The families placed in the 'Key,' under A. b. b^1. have no greater claim to be other than subfamilies of Tineidæ than many that are not differentiated, except perhaps the Pyralidæ. They differ by superficial characters, chiefly the good old one of size. The table and key still show traces of a fault to which all systematists are prone, and, from having had the field so much to themselves, neurationists perhaps more than others. That is, the assumption that a similar neuration (or whatever character the systematist affects) means alliance, a different one divergence, not merely usually and generally, as is indeed truly the case, but practically always and without exception. Where other structures dispute this position, they are prepared to say that these other structures may differ widely in allied forms, or may have reached a practically identical specialisation in very distinct forms; no doubt a correct proposition, but they appear to be unable to apply it to the character they have adopted. This is no doubt largely inevitable, as a specialist does not know what value to attach to structures that he has not studied in detail. We recognise in the table that its author is still largely a neurationist, but not absolutely so, or altogether unable to use his wide knowledge to modify neurational conclusions.

T. A. C.

ON SOME AQUATIC RHYNCHOTA FROM JAMAICA.

By G. W. Kirkaldy.

The works of Uhler, Guérin, Poey, and others have made a good foundation for a knowledge of the aquatic Rhynchota of Cuba, Grenada, and St. Vincent, among the Antilles; but it is remarkable that, with the exception of two species, nothing has been recorded from the large island of Jamaica.

My kind friend Mr. C. B. Taylor has lately been collecting for me in the vicinity of Kingston, and the results of his first consignment are now recorded.

1. Kallistometra, n. gen.

Belonging to the family Gerridæ and tribe Halobatitæ.

First segment of the antennæ nearly twice as long as the second. Pronotum short, mesonotum and metanotum well developed; suture between meso- and metasternum straight. Metasternum apparently concealed by mesosternum. Posterior femora longer than intermediate, which are longer than anterior. Second segment of anterior tarsi three times as long as the first. Claws inserted below the apices of the tarsi.

Differs from *Trepobates*, Uhler, in the incrassation of the anterior femora, in the straightness of the posterior margin of the mesonotum, &c.; from *Trepobatopsis*, Champion, in the elongate oval form, in the visibility of the propleura from above, in the straightness of the posterior margin of the mesonotum, &c. The length of the abdomen, moreover, will distinguish it from any of the smaller Halobatitæ (Gerrinæ with convex intero-lateral ocular margins).

Type. *K. taylori*, n. sp.

♀. Apterous. First antennal segment two-thirds longer than the head, nearly twice as long as the second segment. Eyes large, oblique. Head longer than the short transverse pronotum, the breadth of which is twice as great as its length. Mesonotum two and a half times as long (along its median line) as the pronotum; two-thirds longer than the metanotum (along its median line). Metanotum triangularly produced at the base on either side of the middle point at an angle of about 135°. Pronotum and mesonotum not clearly sutured from their pleura. Mesopleura produced triangularly over the metapleura. Labrum very small, acutely triangular; rostrum reaching well beyond the apical margin of the mesosternum. Posterior femur one-sixth longer than the intermediate, which is three-quarters longer than the anterior; anterior femur one-half longer than the tibia, which is three-fifths longer than the tarsi, second tarsal segment three times as long as the first; claws inserted about two-thirds of the length of the second segment from its base. Posterior femur about seven and one half times longer than the tibia. Seventh abdominal (ventral) segment roundly emarginate. Length 3·75 mill., width 1·9 mill.

Jamaica, St. Andrew; C. B. Taylor, Sept. 1898.

Black and stramineous. Head stramineous, with a broad black median line between the eyes. Pronotum stramineous, with two almost contiguous median black lines, mesonotum with a narrow black median line and two submarginal elongate O's, their centres stramineous, base of mesonotum (except at the middle) stramineous. Metanotum with four broad diagonal stramineous bands, the two basal uniting anteriorly to form an obtuse angle. First abdominal segment with a large stramineous spot in the middle, sixth and seventh segments stramineous. Antennæ blackish (except the basal fourth of first segment); labrum and apical two segments of rostrum black. Mesopleura with a broad black marginal band extending almost from the apex to the base; mesosternum with a narrow black submarginal line and two short almost parallel black lines near the middle. Sternal sutures of thorax and ventral suture of connexivum black; the rest of ventral surface yellowish cinereous. Anterior tarsi, posterior femora, and posterior tibiæ blackish; anterior femora yellowish, with two black annules near the apex, anterior tibiæ yellowish, black near the apex and base; intermediate femora yellowish, with two or three long black lines.

*2. *Pelocoris femoratus* (Palisot de Beauvois).

"From under floating weed" in "the Hunts Bay River, St. Catharine."

*3. *Belostoma colossicum* (Stål.).

No special locality.

*4. *Belostoma annulipes*, Herrich-Schäffer.

No special locality.

*5. *Ranatra annulipes*, Stål.

The vicinity of Kingston is not favourable to the collection of waterbugs, as there are no ponds or pools of still water. From an ornamental tank (Constant Spring, St. Andrew), "about two-thirds full of tepid foul water, the surface entirely covered with confervæ," an hour's work produced this species and fragments of a *Notonecta*.

6. *Notonecta undulata*, Say.

Mr. Taylor informs me that this species "comes to 'light' in great numbers, and is often a great nuisance at the dinner-table."

St. Andrew, four or five miles from Rae Town; Balaclava, St. Elizabeth (middle of the island).

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* The species preceded by an asterisk have been kindly examined by Dr. Montandon also.

This is the "*N. variabilis*, Fieber," of Guérin, in Sagra's 'Cuba,' and differs slightly from the northern *undulata* in the form of the head, but scarcely sufficiently to warrant a varietal name. The colouring of the elytra varies from almost unicolorous pale luteous (with a yellow mesonotum) to almost black, with a luteous claval band (and a black mesonotum).

7. *Anisops antigone*, n. sp.

Belongs to "*macrophthalmus*" group.

♀. Pronotum, mesonotum, and elytra finely but rather sparsely punctured. Head short, rather truncate in front, vertex five-eighths wider than synthlipsis. Mesonotum one-third longer than pronotum, posterior margin of the latter sinuate. Anterior tibia one-fourth longer than the tarsus, armed with a strong tooth at the base, first segment of tarsus nearly twice as long as second; claws falcate. Intermediate tibia one-fourth longer than tarsus, first segment of the latter two-thirds longer than the second; claws falcate. Posterior femora armed with a double row of fairly stout spines, each row containing about twenty-five spines, set somewhat widely apart. Length 8·5 mill.

Jamaica, St. Andrew; C. B. Taylor, Sept. 1898.

This species bears a certain resemblance to large females of *A. pallipes* (Fabricius), in which, however, the claws are digitiform, and the posterior femora are armed with two rows of slight spines, each row consisting of nearly one hundred closely-set spines. It is remarkable that in nearly all the species of *Anisops* known to me the male is comparatively, in some species extremely, rare.

Cinereous, hyaline; labrum and *entire rostrum* black, and a longitudinal blackish line along the posterior legs; venter of abdomen and last four or five segments (dorsal) of abdomen blackish.

8. *Anisops elegans*, Fieber.

A single specimen from St. Andrew.

The only other records from Jamaica, of which I am aware, are—

9. *Trochopus plumbeus* (Uhler) = *marinus*, Carpenter. [See Carpenter in Ent. Mo. Mag. 1898, p. 78.]

10. *Rhagovelia collaris* (Burm.). [See Johnson and Fox in 'Entom. News,' iii. 1892, p. 60.]

There are also some examples of a species of *Corixa* from Jamaica in Dr. Montandon's collection, now before me. They are probably *C. kollarii*, Fieber, but as they are all females, I cannot be sure.

LEPIDOPTERA FROM CHINA.

By W. F. Kirby, F.L.S., F.E.S.

I have lately received a small collection of insects of various Orders from Mr. T. B. Fletcher, of H.M.S. 'Centurion,' for the Natural History Museum; and as they are all carefully labelled with dates and localities, I think it may be useful to publish a list of the Lepidoptera, though they are but few. All except those which I have marked "C" (Chifu) and "H. K." (Hong Kong) were taken on Len-Kung-Tan Island, Wei-Hai-Wei. All were taken during 1898.

Lethe rohria, Fab. (H. K.); March 23rd.

Mycalesis mineus, L., var. *confucius*, Leach (H.K.); March 15th and 17th.

Crebeta deidamia, Eversm.; March 28th.

Cœnonympha amaryllis, Cram.; June 14th.

Clerome eumeus, Drury (H. K.); March 17th.

Argynnis nerippe, Felder; June 14th.

Neptis hainana, Moore (H. K.); March 12th.

Zemeros confucius, Moore (H. K.); March 12th.

Chrysophanus turcicus, Gerh. (C.); May 5th and 13th.

Pieris daplidice, L.; June 12th.

Macroglossa stellatarum, L.; June 14th.

Zygæna phegea, L.; June 14th.

Spilarctia bifrons, Walk. (H. K.); March 12th.

Heliothis scutosa, W. V.; June 12th.

Spiramia simplicior, Butl. (C.); May 21st.

Zygæna phegea is perhaps, geographically, the most interesting species in the above list.

Natural History Museum, Nov. 24th.

THE NOMENCLATURE AND ARRANGEMENT OF BRITISH BUTTERFLIES ACCORDING TO VARIOUS RECENT AUTHORS.

In the following list of British Butterflies the species are arranged as enumerated in the 'Entomologist Synonymic List.' References are given to 'Lepidoptera of the British Islands,' vol. i., by C. G. Barrett (1893); 'A Handbook of British Lepidoptera,' by E. Meyrick (1895); and 'British Butterflies,' by J. W. Tutt (1896). Newman's 'British Butterflies' is also cited, and the generic changes indicated by Prof. A. Radcliffe Grote (Proc. South London Entomological and Natural History Society, 1897, pp. 54–59) are also included. The figures in brackets show the sequence of the species according to the arrangement of each author referred to.

RICHARD SOUTH.

LIST OF BRITISH BUTTERFLIES.

1. PAPILIO MACHAON, Linn.
   P. machaon, Barr. p. 13 (1); Meyr. p. 355 (60); Tutt, p. 217 (28); Newm. p. 150 (52).
2. APORIA CRATÆGI, Linn.
   A. cratægi, Barr. p. 18 (2); Meyr. p. 354 (59); Tutt, p. 225 (29); Newm. p. 167 (59).
3. PIERIS BRASSICÆ, Linn.
   P. brassicæ, Barr. 21 (3); Meyr. p. 354 (58); Tutt, p. 229 (30); Newm. p. 165 (58).
   Mancipium brassicæ, Grote (2).
4. PIERIS RAPÆ, Linn.
   P. rapæ, Barr. p. 23 (4); Meyr. p. 253 (57); Tutt, p. 232 (31); Newm. p. 161 (57).
5. PIERIS NAPI, Linn.
   P. napi, Barr. p. 24 (5); Meyr. p. 253 (56); Tutt, p. 235 (32); Newm. p. 160 (56).
6. PIERIS DAPLIDICE, Linn.
   P. daplidice, Barr. p. 26 (6); Meyr. p. 353 (55); Tutt, p. 240 (33); Newm. p. 158 (55).
   Pontia daplidice, Grote (5).
7. EUCHLOË CARDAMINES, Linn.
   Anthocharis cardamines, Barr. p. 28 (7); Newm. p. 156 (54).
   Euchloë cardamines, Meyr. p. 352 (53); Tutt, p. 243 (34).
8. LEUCOPHASIA SINAPIS, Linn.
   L. sinapis, Barr. p. 30 (8); Meyr. p. 352 (54); Tutt, p. 248 (35); Newm. p. 154 (53).
   Leptidia sinapis, Grote (11).
9. COLIAS HYALE, Linn.
   C. hyale, Barr. p. 32 (9); Meyr. p. 350 (50); Tutt, p. 251 (36); Newm. p. 141 (49).
   Eurymus hyale, Grote (8).
10. COLIAS EDUSA, Fabr.
   C. edusa, Barr. p. 35 (10); Meyr. p. 351 (51); Tutt, p. 257 (37); Newm. p. 143 (50).
   Eurymus edusa, Grote (9).
11. GONOPTERYX RHAMNI, Linn.
   Gonepteryx rhamni, Barr. p. 39 (11); Meyr. p. 351 (52); Tutt, p. 263 (38).
   Rhodocera rhamni, Newm. p. 147 (51).
   Colias rhamni, Grote (7).

12. ARGYNNIS SELENE, Schiff.
A. selene, Barr. p. 178 (46); Meyr. p. 330 (7); Newm. p. 37 (7).
Brenthis selene, Tutt, p. 295 (43).

13. ARGYNNIS EUPHROSYNE, Linn.
A. euphrosyne, Barr. p. 174 (45); Meyr. p. 330 (6); Newm. p. 35 (6).
Brenthis euphrosyne, Tutt, p. 300 (44).

14. ARGYNNIS LATONA, Linn.
A. lathonia, Barr. p. 170 (44); Meyr. p. 330 (5); Tutt, p. 281 (40); Newm. p. 33 (5).
Issoria lathonia, Grote (25).

15. ARGYNNIS AGLAIA, Linn.
A. aglaia, Barr. p. 167 (43); Meyr. p. 329 (4); Tutt, p. 290 (42); Newm. p. 25 (2).

16. ARGYNNIS ADIPPE, Linn.
A. adippe, Barr. p. 161 (42); Meyr. p. 329 (3); Tutt, p. 285 (41); Newm. p. 31 (4).

17. ARGYNNIS PAPHIA, Linn.
A. paphia, Barr. p. 156 (41); Meyr. p. 329 (2); Newm. p. 22 (1).
Dryas paphia, Tutt, p. 274 (39).

18. MELITÆA AURINIA, Rott.
M. artemis, Barr. p. 196 (49); Newm. p. 39 (8).
M. aurinia, Meyr. p. 331 (8); Tutt, p. 315 (47).

19. MELITÆA CINXIA, Linn.
M. cinxia, Barr. p. 190 (48); Meyr. p. 331 (9); Tutt, p. 310 (46); Newm. p. 43 (9).

20. MELITÆA ATHALIA, Rott.
M. athalia, Barr. p. 185 (47); Meyr. p. 331 (10); Tutt, p. 304 (45); Newm. p. 46 (10).

21. VANESSA C-ALBUM, Linn.
V. c-album, Barr. p. 121 (34); Meyr. p. 332 (11).
Polygonia c-album, Tutt, p. 344 (52).
Grapta c-album, Newm. p. 49 (11).

22. VANESSA POLYCHLOROS.
V. polychloros, Barr. p. 127 (35); Meyr. p. 333 (13); Newm. p. 55 (13).
Eugonia polychloros, Tutt, p. 340 (51).

23. VANESSA URTICÆ, Linn.
V. urticæ, Barr. 131 (36); Meyr. p. 333 (12); Newm. p. 52 (12).
Aglais urticæ, Tutt, p. 334 (50).

24. VANESSA IO, Linn.
V. io, Barr. p. 136 (37); Meyr. p. 333 (14); Newm. p. 60 (15); Tutt, p. 325 (48).
Hamadryas io, Grote (19).

25. Vanessa antiopa, Linn.
 V. antiopa, Barr. p. 140 (38); Meyr. 333 (15); Newm. p. 58 (14).
 Euvanessa antiopa, Tutt, p. 329 (49).

26. Vanessa atalanta, Linn.
 V. atalanta, Barr. p. 145 (39); Meyr. p. 334 (16).
 Pyrameis atalanta, Tutt, p. 355 (54); Newm. p. 62 (16).

27. Vanessa cardui, Linn.
 V. cardui, Barr. p. 149 (40); Meyr. p. 334 (17).
 Pyrameis cardui, Tutt, p. 350 (53); Newm. p. 64 (17).

28. Limenitis sibylla, Linn.
 L. sibylla, Barr. p. 117 (33); Meyr. p. 335 (18); Tutt, p. 361 (55); Newm. p. 67 (18).

29. Apatura iris, Linn.
 A. iris, Barr. p. 105 (31); Meyr. p. 335 (19); Tutt, p. 380 (57); Newm. p. 71 (19).
 Potamis iris, Grote (13).

30. Melanargia galatea, Linn.
 M. galathea, Barr. p. 204 (50); Meyr. p. 337 (20); Newm. p. 77 (20).
 M. galatea, Tutt, p. 435 (68).
 Agapetes galathea, Grote (32).

31. Erebia epiphron, Knoch.
 E. epiphron, Barr. p. 210 (51); Meyr. p. 340 (28); Newm. p. 80 (21).
 Melampias epiphron, Tutt, p. 425 (66).

32. Erebia æthiops, Esp.
 E. blandina, Barr. p. 216 (52).
 E. æthiops, Meyr. p. 340 (27); Tutt, p. 430 (67).
 E. medea, Newm., p. 82 (22).

33. Pararge egeria, Linn.
 P. ægeria, Barr. p. 227 (54); Meyr. p. 337 (21).
 P. egeria, Tutt, p. 387 (58).
 Pyrarga egeria, Newm. p. 86 (23).

34. Pararge megæra, Linn.
 P. megæra, Barr. p. 234 (55); Meyr. p. 337 (22); Tutt, p. 392 (59).
 Pyrarga megæra, Newm. p. 87 (24).
 Lasiommata megæra, Grote (31).

35. Satyrus semele, Linn.
 S. semele, Barr. p. 222 (53); Meyr. p. 338 (23); Newm. p. 89 (25).
 Hipparchia semele, Tutt, p. 397 (60).
 Eumenis semele, Grote (40).

36. EPINEPHELE IANIRA, Linn.
E. janira, Barr. p. 240 (56); Meyr. p. 339 (24); Tutt, p. 402 (61); Newm. p. 91 (26).
Maniola ianira, Grote (39).

37. EPINEPHELE TITHONUS, Linn
E. tithonus, Barr. p. 245 (57); Meyr. p. 339 (25); Tutt, p. 407 (62); Newm. p. 93 (27).
Pyronia tithonus, Grote (38).

38. EPINEPHELE HYPERANTHES, Linn.
E. hyperanthus, Barr. p. 251 (58); Meyr. p. 339 (26); Newm. p. 95 (28).
Enodia hyperanthus, Tutt, p. 411 (63).
Hipparchia hyperanthus, Grote (33).

39. CŒNONYMPHA TYPHON, Rott.
C. davus, Barr. p. 255 (59); Newm. p. 97 (29).
C. tiphon, Meyr. p. 341 (29); Tutt, p. 416 (64).

40. CŒNONYMPHA PAMPHILUS, Linn.
C. pamphilus, Barr. p. 263 (60); Meyr. p. 341 (30); Tutt, p. 421 (65); Newm. 101 (30).

41. THECLA BETULÆ, Linn.
T. betulæ, Barr. p. 43 (12); Meyr. p. 343 (35); Newm. p. 112 (36).
Zephyrus betulæ, Tutt, p. 202 (24).

42. THECLA W-ALBUM, Knoch.
T. w-album, Barr. p. 45 (13); Meyr. p. 343 (34); Tutt, p. 206 (25); Newm. p. 108 (34).

43. THECLA PRUNI, Linn.
T. pruni, Barr. p. 48 (14); Meyr. p. 343 (33); Tutt, p. 208 (26); Newm. p. 110 (35).

44. THECLA QUERCUS, Linn.
T. quercus, Barr. p. 51 (15); Meyr. p. 344 (36); Newm. p. 106 (33).
Zephyrus quercus, Tutt, p. 199 (23).
Aurotis quercus, Grote (45).

45. THECLA RUBI, Linn.
T. rubi, Barr. p. 53 (16); Meyr. p. 343 (32); Newm. p. 105 (32).
Callophrys rubi, Tutt, p. 196 (22).

46. POLYOMMATUS DISPAR, Haw.
Chrysophanus dispar, Barr. p. 56 (17); Meyr. p. 346 (42); Tutt, p. 149 (9).
Polyommatus hippothoë, Newm. p. 114 (37).

47. POLYOMMATUS PHLŒAS.
Chrysophanus phlæas, Barr. p. 62 (18); Meyr. p. 346 (41); Tutt, p. 152 (10).
Polyommatus phlæas, Newm. p. 115 (33).
Heodes phlæas, Grote (58).

48. LYCÆNA BŒTICA, Linn.
L. bœtica, Barr. p. 65 (19); Meyr. p. 347 (43).
Lampides bœtica, Newm. p. 117 (39); Tutt, p. 192 (21).

49. LYCÆNA ÆGON, Schiff.
L. ægon, Meyr. p. 348 (47); Newm. p. 119 (40).
Polyommatus ægon, Barr. p. 70 (21).
Plebeius ægon, Tutt, p. 182 (18).
Lycæides ægon, Grote (49).

50. LYCÆNA ASTRARCHE, Bgstr.
Polyommatus agestis, Barr. p. 73 (22).
Chrysophanus astrarche, Meyr. p. 346 (40).
Polyommatus astrarche, Tutt, p. 179 (17).
Lycæna medon, Newm. p. 123 (41).

51. LYCÆNA ICARUS, Rott.
Polyommatus alexis, Barr. p. 77 (23).
Lycæna icarus, Meyr. p. 349 (48); Newm. p. 128 (42).
Polyommatus icarus, Tutt, p. 174 (16).

52. LYCÆNA BELLARGUS, Rott.
Polyommatus adonis, Barr. p. 80 (24).
Lycæna bellargus, Meyr. p. 348 (46).
Polyommatus bellargus, Tutt, p. 170 (15).
Lycæna adonis, Newm. p. 129 (43).

53. LYCÆNA CORYDON, Fabr.
Polyommatus corydon, Barr. p. 85 (25); Tutt, p. 166 (14).
Lycæna corydon, Meyr. p. 348 (45); Newm. p. 131 (44).

54. LYCÆNA ARGIOLUS, Linn.
Polyommatus argiolus, Barr. p. 88 (26).
Lycæna argiolus, Meyr. p. 347 (44); Newm. p. 135 (47).
Cyaniris argiolus, Tutt, p. 187 (20).

55. LYCÆNA SEMIARGUS, Rott.
Polyommatus acis, Barr, p. 94 (28).
Chrysophanus semiargus, Meyr. p. 345 (39).
Nomiades semiargus, Tutt, p. 164 (13).
Lycæna acis, Newm. p. 133 (45).

56. LYCÆNA MINIMA, Fues.
Polyommatus alsus, Barr. p. 92 (27).
Chrysophanus minimus, Meyr. p. 345 (38).
Cupido minima, Tutt, p. 160 (12).
Lycæna alsus, Newm. p. 134 (46).

57. LYCÆNA ARION, Linn.
Polyommatus arion, Barr. p. 96 (29).
Lycæna arion, Meyr. p. 349 (49); Tutt, p. 157 (11); Newm. p. 136 (48).

58. NEMEOBIUS LUCINA, Linn.
N. lucina, Barr. p. 102 (30); Meyr. p. 342 (31); Tutt, p. 210 (27); Newm. p. 103 (31).

59. yrichthus malvæ, Linn.
S. alveolus, Barr. p. 268 (61); Tutt, p. 122 (2).
Hesperia malvæ, Meyr. p. 356 (61); Newm. p. 170 (60).

60. Nisoniades tages, Linn.
N. tages, Barr. p. 304 (68); Tutt, 119 (1).
Hesperia tages, Meyr. p. 357 (62); Newm. p. 170 (61).
Thanaos tages, Grote (67).

61. Hesperia thaumas, Hufn.
H. linea, Barr. p. 275 (62); Newm. p. 174 (66).
Pamphila thaumas. Meyr. p. 358 (64).
Thymelicus thaumas, Tutt, p. 138 (7).
Adopæa thaumas, Grote (64).

62. Hesperia actæon, Rott.
H. actæon, Barr. p. 283 (64); Newm. p. 173 (65).
Pamphila actæon, Meyr. p. 359 (66).
Thymelicus actæon, Tutt, p. 132 (5).
Adopæa actæon, Grote (63).

63. Hesperia sylvanus, Esp.
H. sylvanus, Barr. p. 289 (65); Newm. p. 172 (63).
Pamphila sylvanus, Meyr. p. 359 (67); Tutt, p. 126 (3).
Augiades sylvanus, Grote (62).

64. Hesperia comma, Linn.
H. comma, Barr. p. 294 (66); Newm. p. 172 (64).
Pamphila comma, Meyr. p. 359 (68); Tutt, p. 128 (4).
Erynnis comma, Grote (61).

65. Carterocephalus palæmon, Pall.
C. palæmon, Tutt, p. 140 (8).
Cyclopides paniscus, Barr. p. 298 (67).
Cyclopædes palæmon, Meyr. p. 357 (63).
Hesperia paniscus, Newm. p. 171 (62).
Pamphila palæmon, Grote (60).

Species added to British List since 1884.

Lycæna argiades, Pall.
L. argiades, Barr. p. 68 (20).
Chrysophanus argiades, Meyr. p. 245 (37).
Everes argiades, Tutt, p. 185 (19).

Hesperia lineola, Ochs.
H. lineola, Barr. p. 279 (63).
Pamphila lineola, Meyr. p. 258 (65).
Thymelicus lineola, Tutt, p. ~~2~~35 (6). 135
Adopæa lineola, Grote (65).

NOTES AND OBSERVATIONS.

Xylina furcifera.—I was much interested in the history (given by the Editor) of the British specimens of *X. furcifera* (*ante*, p. 18). As I was one of the earliest breeders of this beautiful insect, I should like to add my experience of it. On Christmas Day, 1871, I received the generous gift of eighteen eggs from Mr. Evan John, of Llantrissant, Glamorganshire. The larvæ hatched the following March. With some difficulty I managed to feed them with bruised buds and bark of alder, the tree not being in leaf at that early period of the year. I had the singular good fortune of breeding the whole eighteen magnificent specimens, nine of which are in my collection now.—(Rev.) J. Greene; Rostrevor, Clifton, Bristol.

Continental Locality for Lycæna (Polyommatus) arion wanted.—I should be very grateful if any of your correspondents could tell me of a locality on the Continent where *Polyommatus arion* is common, and the approximate date of its appearance on the wing. I am anxious to secure a number of females with a view to breeding this insect.—C. Dallas; Lymington, Hants.

The Basal Spot on Amphidasys betularia.—In the 'Entomologist' for January, p. 16, Mr. J. Arkle asks whether the white basal spot is confined to the females of *Amphidasys betularia*, as his limited experience would seem to suggest. It will, therefore, interest him to know that it is certainly not a sexual distinction. Of var. *doubledayaria* I have thirty bred specimens (about equally divided between the two sexes) before me as I write. In everyone of these the white basal spot is present, thought it is, as a rule, larger and therefore more conspicuous in the females than in the males, in which it is occasionally reduced to a minimum. It is also present in both sexes of the typical form of the insect, though, owing to the colours of the wing, it is not nearly so noticeable as in the variety.—Eustace R. Bankes; The Rectory, Corfe Castle, Dec. 31st, 1898.

In reference to the note on this subject by Mr. Arkle (*ante*, p. 16), we have a bred specimen of the black variety *doubledayaria*, a male, which has the distinct white spot at the base of the upper wings; and we have also two females of the typical form with the basal spots present. —J. and W. Hill; Leek, Jan. 9th, 1899.

Antennal Structure *versus* Genitalia.—In "Notes on the genus *Mamestra*, Ochs., with descriptions of New Species" ('Entom. News,' ix. 240), Prof. Smith remarks: "The character of the antennal structure is not so important as I believed at first, and would, if strictly adhered to now, separate species closely allied. As it appears now, the change from shortly pectinated to simply ciliated is so gradual that no dividing line is possible, and the rearranged groups will, in some cases, contain forms with simple and with pectinated antennæ. On the other hand, all the genitalic groupings have approved themselves; and I am inclined to attribute increased importance to this character in arranging the species of a large genus."

New Work on British Lepidoptera.—Mr. J. W. Tutt is about to publish, at the subscription price of 15/- per volume, an important work on the 'Lepidopterous Insects of the British Islands.' We gather from the prospectus that the subject is to be treated in a thorough and exhaustive manner. Lepidopterists will no doubt make a point of adding these volumes, as they appear, to their library, as when the work is complete they will then be in possession of a valuable digest of all that concerns the technical aspect of the subject, together with a reliable guide to a knowledge of the species themselves, and a magazine of information connected with their life-history, times of appearance, distribution, &c. As the price of each volume is to be increased to 20/- on publication, it will be well for those who wish to secure copies to at once send in their names to Mr. H. E. Page, Bertrose, Gellatly Road, Hatcham, S.E.

PUPATION OF COSSUS LIGNIPERDA.—In the Editorial note to Mr. May's remarks on *Cossus ligniperda* (*ante*, p. 17), I think an article by Mr. Ivy (Entom. xxi. 110), in which he describes how he found a number of pupæ in what he calls "sand caps," has been overlooked. At p. 155 of the same volume he describes what he means by "sand caps."—EDGAR J. MEYNELL; Durham.

NORFOLK COLEOPTERA.—Mr. J. Edwards, of Colesborne, Cheltenham, would be glad of records of captures of beetles in Norfolk, for incorporation in a 'Supplement' to his 'List of Norfolk Coleoptera,' which will go to press early in March.

CAPTURES AND FIELD REPORTS.

CHŒROCAMPA CELERIO IN SURREY.—I have just received from the Rev. E. V. Bond, for identification, a specimen of *C. celerio* taken at Ewell, Surrey, at the end of August last. It is perfect in condition excepting the thorax, which is rubbed.—F. W. FROHAWK; January, 1899.

MIGRATORY LOCUST IN SUSSEX.—The Rev. E. V. Bond has lately sent me for identification a fine specimen of *Œdipoda migratoria*, captured at Lower Beeding, Sussex, about Aug. 25th last. — F. W. FROHAWK; January, 1899.

GONOPTERYX RHAMNI IN JANUARY.—On Jan. 8th last I saw a male specimen of *G. rhamni* in Reigate Park, owing most probably to the mildness of the season. It was flitting gaily along in the sunshine, now and again settling on bramble sprays, seemingly none the worse for its few months' sleep.—WILLIAM GANDY; Beetch View, Reigate, Surrey.

A specimen of *G. rhamni* was seen on the wing in Dulwich village on Jan. 8th this year, by a friend of ours. I suppose this may be accounted for by the mild weather this month?—F. M. B. CARR; 46, Handen Road, Lee, S.E.

VANESSA CARDUI.—Yesterday, Jan. 8th, I saw a very fair specimen of *Vanessa cardui*, flying along a hedgerow on the downs near here; the sun was shining brightly and the weather very mild, but *cardui* seemed rather out of place among the dead and sodden undergrowth.—P. W. RIDLEY; 3, Manor Road, Salisbury.

Collecting in Kent, 1898.—In January and February nothing at all was done, and in March only *Hybernia progemmaria* was noticed, to which were added, in April, *Larentia multistrigata, Anisopteryx æscularia, Hemerophila abruptaria, Anticlea badiata, Gonopteryx rhamni* (hybernated) and *Pieris rapæ.*

In May *Tephrosia punctulata* was taken at Birchwood; and an expedition to Chelsfield and Cudham on the 30th produced *Ligdia adustata, Corycia taminata* (one), *Melanippe montanata, M. rivata* and *Euclidia glyphica*, although none of these were in any abundance. The males of *Euchloë cardamines* were abundant in the lanes near Chelsfield and Cudham, and three *Thecla rubi* were noticed at Cudham, *Lycæna argiolus* and *Thymele alveolus* were also seen.

In June forty-four species were noticed. On the 5th *T. punctula, L. adustata*, and larvæ of *Hylophila bicolorana* and *Cymatophora diluta* were taken at Bexley. On the 8th and 12th *Eupithecia venosata, Minoa euphorbiata, Tephrosia punctulata, T. extersaria, T. crepuscularia, Melanippe galiata* and *Corycia taminata* were taken (one or two of each) at Chelsfield and Shoreham. On the 19th two *Ephyra punctaria* and two *Acidalia bisetata* were noticed at Bexley, and *Platypteryx falcula, Asthena luteata, Emmelesia decolorata* and *Anticlea rubidata* were taken singly, whilst *Hylophila prasinana* was abundant.

July was by far the most successful month. *Ligdia adustata, Asthena luteata, Scotosia vetulata, Hylophila prasinana, Hepialus hectus, Hadena dentina* and *Aplecta nebulosa* were taken on a visit to Hayes and West Wickham, but treacle in West Wickham Wood produced nothing. In the garden here at Lee *Nænia typica* was fairly plentiful, and *Apamea basilinea, Hecatera serena* and *Asthena luteata* occurred singly, amongst other commoner insects. At Bexley I took a male of *Limacodes testudo*, two *Calligenia miniata, Hepialus hectus, Hylophila prasinana, Metrocampa margaritaria, Larentia pectinitaria, L. didymata, Cidaria fulvata, Asthena luteata, Noctua triangulum* and *Aplecta nebulosa*, larvæ of *Bombyx neustria* and *Notodonta camelina*; and on the 10th I was fortunate enough to take a nearly full-grown larva of *Notodonta chaonia*, which pupated safely. At treacle *Dipterygia pinastri, N. festiva* and *Rusina tenebrosa* occurred. *Anticlea rubidata* was seen at Orpington, *Timandra amataria* taken at Grove Park, and *Platypteryx falcula* at Chiselhurst. The 31st July and 1st August were spent at Shoreham, where *Eubolia bipunctata* and *Zygæna filipendulæ* were in swarms. *Geometra papilionaria, Scotosia rhamnata, Larentia olivata, Coremia propugnata, Larentia didymata, Bombyx neustria*, and *Melanargia galatea* were also taken; and *Hipparchia* (*Epinephele*) *hyperanthus* and *Lycæna ægon* were plentiful.

During August *Mania maura* and *Triphæna ianthina*, especially the former, occurred plentifully at Lee, whilst *Pelurga comitata* and *Luperina testacea* were taken singly. *Platypteryx falcula* and *Cidaria silaceata* were taken at Bexley. A specimen of *Smerinthus populi* was captured here on August 6th, and larvæ of *S. populi, S. tiliæ*, and *Acronycta megacephala* were tkean.

October 8th I saw a specimen of *Melanippe fluctuata* on a tree-trunk at Dartford—surely rather an unusual date? Oct. 9th some beautifully fresh specimens of *Gonepteryx rhamni* were taken at Shoreham, and I also noticed *Vanessa atalanta* (one) and *Lycæna alexis* (one). Oct. 23rd I noticed two *Vanessa urticæ* in this road. This month was an exceptionally mild one.

In November *Oporabia dilutata*, *Hybernia aurantiaria*, *Cheimatobia brumata*, *Cerastis vaccinii*, *Cerastis* (*spadicea*) *ligula*, and *Scopelosoma satellitia* were noticed.

I have omitted from these notes collecting in the New Forest (July 16–27) and treacling in September and October, which have already been referred to in the 'Entomologist' (xxxi. 294, 296). The season of 1898 was not very productive, and was much more backward than that of 1897, at least so far as our collecting was concerned. Treacle was an utter failure until September, when it was productive till the end of October. We did not try light very much, and most of our insects were obtained by beating, searching and dusking.—F. M. B. Carr; 46, Handen Road, Lee, S.E.

Notes from North Staffordshire in 1898.—Collecting has been fairly productive in this district during the past season, sugar, however, not being very successful until the autumn. The following is a partial list of insects taken:—Amongst other butterflies taken or seen through the season were *Argynnis selene*, common locally; *Vanessa urticæ*, *V. atalanta*, *Euchloë* (*Anthocharis*) *cardamines*, *Pieris napi* and *P. brassicæ*, which has been very common. Amongst the moths were *Smerinthus populi*, *Sesia tipuliformis*, *Nudaria mundana*, *Bombyx rubi*, *Saturnia carpini*, *Uropteryx sambucata*, *Metrocampa margaritaria*, *Amphidasys betularia* and the black variety *doubledayaria; Eupisteria heparata*, *Venusia cambricaria*, not uncommon, but local; *Macaria liturata*, amongst pines; *Halia wavaria*, *Panagra petraria*, *Fidonia piniaria*, *Abraxas ulmata*, *Cheimatobia boreata*, *Oporabia filigrammaria*, a few on the moors during August and September; *Larentia multistrigata*, *L. cæsiata*, *Emmelesia affinitata*, *Eupithecia pulchellata*, *E. subumbrata*, and several other species undetermined; *Thera variata*, *Hypsipetes impluviata*, *Melanthia rubiginata*, *M. ocellata*, *Melanippe tristata*, *M. rivata*, *M. galiata*, *Anticlea badiata*, *Coremia munitata*, one specimen; *Cidaria corylata*, *C. russata*, *C. immanata*, *C. suffumata*, *C. ribesiaria*, *C. fulvata*, *C. pyraliata*, *C. dotata*, *Eubolia bipunctata*, *Cilix spinula*, *Dicranura vinula*, *Notodonta camelina*, *N. dictæa*. On Sept. 5th five larvæ of *N. ziczac* were taken on sallows; *Bryophila perla*. Our first night at sugar, on June 20th, produced a fine specimen of *Acronycta leporina* and another was taken at rest on July 3rd. *A. rumicis*, *Leucania impura*, *Miana* (*Chortodes*) *arcuosa*, *Charæas graminis*, *Apamea basilinea*, *Agrotis porphyrea*, *Orthosia macilenta*, *Anchocelis rufina*, *Xanthia cerago*, *X. silago*, *Polia chi*, *Agriopis aprilina*, *Hadena protea*, *H. glauca*, fairly common. *H. dentina*, *H. thalassina*, *Cloantha solidaginis*, *Calocampa exoleta*, *Anarta myrtilli*, *Habrostola urticæ* and *H. triplasia*, at flowers of rocket and at light.—J. & W. Hill; 7, Westwood Grove, Leek, Staffs, Jan. 9th, 1899.

Sphinx convolvuli in the Isle of Wight, 1898.—This species was very plentiful in Ryde last year, twenty specimens being taken in the garden of Little Appley during the last ten days of September hovering round a bed of *Nicotiana*. A number of other specimens were taken in and near Ryde during the season.—A. Bevis; 71, Union Street, Ryde.

SOCIETIES.

Entomological Society of London.—*December 7th*, 1898.—Mr. R. Trimen, F.R.S., President, in the chair. Monsieur Léon Candèze, of 64, Rue de l'Ouest, Liège; Mr. C. L. B. Stares, M.R.C.S., L.R.C.P., of the Infirmary, Wandsworth, S.W.; Mr. A. Russell, of the Limes, Southend, Catford; and Mr. C. B. Holman Hunt, of Meddecombra, Watagoda, Ceylon, were elected Fellows of the Society. Mr. McLachlan exhibited a series of specimens of the neuropterous genus *Tetracanthagyna*, De Selys, including a pair of a new species from Borneo, which was the largest known of all recent dragonflies, though it was slightly exceeded in wing-area by the much more slender *Megaloprepus cœrulatus*, a common Central-American species. Mr. A. H. Jones showed about sixty species of Lepidoptera, taken round electric lights at Zermatt, in August. Among the more interesting were *Crateronyx taraxaci*, *Ellopia fasciaria* ab. *prasinaria*, *Cidaria cyanata*, *Hadena maillardi*, a light form of *Dianthœcia cæsia*, and a fine black variety of *Polia flavicincta*. Dr. Dixey exhibited a series of Pierid butterflies from the Neotropical region, to show the existence among them of seasonal forms. The President observed that the exhibit was of special interest, as affording the first recorded evidence of the existence of seasonal dimorphism in Neotropical butterflies. Mr. G. T. Porritt exhibited an extraordinary variety of *Bombyx quercus*, bred in June last by Mr. W. Tunstall, from a larva found near Huddersfield. The specimen was a female of deep chocolate colour, with the band very faintly traced in dark olive. Dr. Chapman, Mr. Lloyd, and Mr. Nicholson exhibited butterflies taken by them in Norway from June 20th to July 22nd, during the past summer, at latitudes 60° 12′ and 69° 50′. It appeared from the exhibit that it would have been better to collect a month or so earlier, especially in the more northern locality visited. It was also seen that northern races of butterflies and moths were apt to differ a little from those of the mid-European fauna, but that various named varieties supposed to be characteristic boreal representatives of their species were often rather aberrations, and not the dominant northern type. This was the case in *Vanessa urticæ*, *Erebia medusa*, *E. ligea*, &c.; on the other hand, as in *Brenthis selene* var. *hela*, the entire local race was of the variety. Papers were contributed—by Mr. R. McLachlan, entitled "Considerations on the genus *Tetracanthagyna*;" by Mr. M. Burr, entitled "A List of Rumanian Orthoptera;" and by Mr. J. H. Leech on "Lepidoptera Heterocera from China, Japan, and Corea."—W. F. H. Blandford, *Hon. Sec.*

South London Entomological and Natural History Society.—*November 24th*, 1898.—Mr. J. W. Tutt, F.E.S., President, in the chair. Mr. Montgomery exhibited a photograph, by Mr. Clarke, of an ovum of *Hesperia comma*; it was smooth, without reticulations. Mr. Adkin, two specimens of *Dicranura bifida*, taken this year in his own garden on the trunk of a poplar tree. Mr. Tutt, additional local forms of *Zygæna*, from M. Oberthur. (I.) *Z. trifolii*: 1, a mountain form; 2, an Algerian form, var. *syracusæ*; 3, a coast form; 4, a large marsh form from Rennes; and 5, series from the French coast opposite the

Channel Islands. (II.) *Z. filipendulæ:* 1, var. *dubia* form; 2, a fine spotted form from the Pyrenees. (III.) Series of *Z. trifolii* from Waxham, for Mr. Bacot; and from South Wales, for Capt. Robertson; and contributed notes. Mr. Milton, a portion of a stone in which an *Odynerus* sp. was found alive, with its cocoon.

December 8th.—The President in the chair. Mr. Bliss, of Hastings, and Mr. Sich, 65, Barrington Road, Chiswick, were elected members. Mr. Carpenter exhibited some fourteen bred varieties of *Melitæa cinxia*, the only ones out of two hundred that were worthy of note, and not one extreme form. Mr. Brooks, of Rotherham, *Apamea oculea*, many varieties: *Euchelia jacobææ*, with a pink flush; a brood of *Amphidasys betularia*, comprising normal, light var. *doubledayaria*, and fine intermediate examples, one being very light and semitransparent; *Triphæna fimbria* in great variety; and *T. ianthina*, rich in colour. Rev. S. Tarbat, cocoons of *Plusia moneta*, found in a friend's garden. Mr. Adkin, *Xylina socia* (*petrificata*), *Calocampa vetusta*, *C. exoleta*, *Agrotis segetum*, *Miselia oxyacanthæ*, and *Cidaria siderata*, all typical of the forms from Co. W. Meath, Ireland. Mr. South, three examples of *Abraxas grossulariata*, bred from larvæ fed on *Sedum*. Most of the larvæ died, and only seven imagines emerged; also a suffused var. of *Melanippe sociata*, comparable to the Hebridean form. Mr. Andrews, a Noctuid from Dartford, supposed to be an extremely dark, blackened form of *Caradrina cubicularis*. Mr. Lucas read notes and observations on dragonflies, illustrating his remarks by a very fine series of slides prepared by himself.

January 12th, 1899.—The President in the chair. Mr. West presented to the Society specimens of 125 species of Hemiptera-Heteroptera, to form a nucleus for a reference collection. Mr. Carpenter exhibited specimens of *Apatura iris*, bred from New Forest larvæ, and read notes on their hybernation. He and other members complained of the damage which was being done by some of the local dealers. who used ropes and a sail with stout cudgels, effectually smashing and destroying the sallows. Mr. Tutt, further specimens of *Zygæna* received from M. Oberthur, of Rennes, and read notes on them. Mr. Adkin, specimens of *Cymatophora octogesima* (*ocularis*), bred, from Colchester. Mr. Lucas, specimens of recent uninvited visitors to Kew Gardens—*Periplaneta americana*, *P. australasiæ*, and *Panchlora maderæ*, from the Belgian Congo; *Anisolabis annulipes?* from Penang; and *Phyllodromia* sp., from Romba, British Central Africa. Mr. Moore, male and female larvæ, larval cases, pupæ and female imagines of the large Psychid moth *Œketicus kirbii*, received from Antigua, West Indies, and contributed notes. Mr. Malcolm Burr, an exceedingly clever imitation of a grasshopper in porcelain, from China, and a case containing a species from each group in the various sections of the Orthoptera to aid in illustrating Mr. Edwards's paper, together with various species, showing protective resemblance. Mr. Edwards, a large number of specimens of Orthoptera, chiefly from Borneo, the Mantidæ and Phasmidæ being very well represented. Among the Locustidæ which he showed were a number of the curious Phasmid-like *Prosopias*, from South America. Mr. Edwards read a paper on Orthoptera, devoting his remarks chiefly to the Phasmids and Mantids. A discussion ensued, and, among others, Messrs. Burr and

Tutt gave interesting accounts of their observations of the habits of the European representatives of these two families.—Hy. J. Turner, *Hon. Report Sec.*

North London Natural History Society.—The seventh Annual Exhibition was held at the Sigdon Road Board School, Dalston Lane, on Saturday, Dec. 31st, on Monday, Jan. 2nd, 1898–9, and was very well attended, notwithstanding very unfavourable weather. The exhibits were numerous and interesting, the entomological section being, as usual, a very important one. This department was under the superintendence of Mr. E. M. Dadd, and included, amongst many interesting exhibits, a very fine lot of Lepidoptera collected by Mr. H. S. Woolley in the neighbourhood of New York, some well-filled drawers of British Lepidoptera from Mr. A. J. Hodges, series of *Hydrilla palustris*, Hb., *Leucania vitellina*, Hb., and other rarities, from the same energetic and successful collector; some fine Vanessid aberrations from Dr. Sequeira's collection, lepidopterous life-histories shown by Mr. F. B. Harvey, Coleoptera by Mr. H. Heasler, &c. Lantern illustrations of "Pond Insects" by Mr. R. Marshman Wattson were on view both evenings, and various other attractions further conduced to a very successful gathering.—Louis B. Prout, *Hon. Sec.*

Cambridge Entomological and Natural History Society.—*November 4th*, 1898.—Mr. Gayner exhibited a collection of Lepidoptera from Northern Sweden and Finland, with some notes on their distribution and occurrence. Argynnidæ were very numerous, especially *Argynnis ino* and sub-species *hela* of *A. selene*. *A. pales* var. *arsilache* was locally abundant in marshy places. Others were *A. aglaia*, *A. euphrosyne* var. *fingal*. Among other insects were an uncertain *Melitæa*, *Polyommatus (Chrysophanus) chryseis*, *P. helle*, *P. virgaureæ* var. *oranula*, *L. ægon*, *Plebeius (Lycæna) optilete*, *Cœnonympha davus*, *Erebia embla*, *Colias palæno*, *Pieris napi*, *Papilio machaon*, *Vanessa antiopa*. Mr. Richard exhibited cocoons of *Plusia moneta*.

November 18th.—Mr. Gayner exhibited specimens of *Pterophorus rhododactylus* from South England. Mr. Jones, a number of *Senta maritima* from Cambridgeshire, showing some well-marked varieties.

Lancashire and Cheshire Entomological Society.—*Annual Meeting* (held at the Museum, William Brown Street). The President, Mr. Samuel J. Capper, F.L.S., F.E.S., in the chair. After the usual business of the Society had been transacted, the officers for the current year were elected, Mr. Capper being again returned as President. In returning thanks for the renewed honour which had been accorded to him, Mr. Capper said that it was indeed difficult to realise that twenty-two years had elapsed since they had first met as a Society in that room. Of the eleven members who constituted the Society on that evening, only two now remained, *viz.* one honorary member, Mr. William Johnson, of Wigan, and himself. In the Annual Report published in 1881 they had fifty-eight ordinary and twelve honorary members. Societies like theirs were liable to fluctuations, depending to a considerable extent on the number of entomologists in the two counties. He was gratified to be able to state that while the roll of members was much the same as heretofore, the library had considerably increased, and that during the past session the attendance had been most satisfactory, the papers read had sustained their scientific reputation, and the discussions had created the liveliest interest in the subjects dealt with by the lecturers. The first meeting of the present session had been unusually successful, there not only being a very large attendance, but the specimens brought for exhibition were to be numbered by thousands. Still, to make the Society a permanent success depended very largely, he might say entirely, upon the members themselves. He remembered with pardonable pride that one of their first lectures was delivered by the late Mr. Benjamin Cooke, on the Genital Armature of the Lepidoptera, and he believed this to be the first notice of such a matter brought before any scientific society. Nor could he speak too highly of the work since done by their own much valued and esteemed member, Mr. F. N. Pierce, in this direction. Mr. Capper thought that investigations of this nature would completely revolutionise the present classification of Lepidoptera, and, if not of primary importance in the differentiation of species, was certainly deserving of equal consideration with the unreliable and often erroneous details of wing-marking. As they understood more fully the true philogenetic relationship of the various forms of animal and vegetable organisms to each other, they would be led more and more to the profound conviction that the definition of, not only species, but of families, orders, and so on to the two great kingdoms themselves, is an impossibility. So intimately related are the various forms, either with others non-existent, or with those widely differing in their modes of life, that lines of demarcation vanish. It is, however, only by the help of students each undertaking the study of one particular branch of nature that the furtherance of a true classification may be hoped for. And while he would specially urge upon the younger members to take up some particular line and pursue it, he would add one word of caution: that, is not to get imbued with the idea that his doxy is orthodoxy, and every other man's doxy is heterodoxy, but rather to remember that

> "By mutual confidence and mutual aid,
> Great deeds are done and great discoveries made."

The President dwelt at some length upon the exhaustive treatise now being published by Mr. Barrett upon the Lepidoptera of the British Isles, which upon completion would be the standard work of reference upon the subject, and mentioned how frequently it happened that a species described as rare often turned up in the greatest profusion as its habits of life became more perfectly understood. Hence he had often expressed the opinion that there was, with few exceptions, no such thing as a rare species. Though he would have to confess that he had sometimes been guilty of giving a few pounds for a moth, it had never been for one that could be called a rarity. His penchant had been for varieties, due in the first instance to his having come into the possession of his late friend Mr. Alfred Owen's collection, who was one of the first who made a speciality of variety collecting. This collection of Owen's is a very wonderful one, and he doubted very much whether such another would ever be formed again; and he was indeed fortunate in securing a collection of varieties formed by one like Mr. Owen, who had a special perception for the detection of the slightest peculiarity, and he well knew, from his intimate connection with him, that he never admitted any insect into his collection at all doubtful as British, or which was not fully authenticated. He suggested that the desire to record nowadays was much overdone, and it must be a great temptation to dealers, when purchasers insist on a minute record, to make a guess of it. Mr. Capper brought an exceptionally interesting address to a close by relating some of his entomological experiences, and gave several illustrations of the now plentiful abundance of previously scarce and consequently valuable insects. And in most instances it was shown that, whereas they may at some period have easily commanded and readily fetched several pounds apiece, they could at the present day be purchased in numbers for as many pence. The insect fauna of Great Britain was represented by many thousands of species, and it was largely due to the unselfish labours of a little band of specialists that Entomological literature held the important position that it does to-day. He hoped that the younger generation would emulate the industry that characterised the work of those whose names were now a by-word amongst them, who had left them such a legacy of knowledge as would spur them on to a more complete understanding of the vast and minute world with which they were surrounded.—F. N. Pierce, *Hon. Sec.*

Birmingham Entomological Society.—*November* 21*st*, 1898.—Mr. P. W. Abbott, V.P., in the chair. Mr. P. W. Abbott showed *Hydrilla palustris* taken at Wicken Fen this year, including one fine dark variety, nearly black; also *Agrotis cinerea* from Brighton and from Wyre Forest; those from the latter locality (where he took six or eight), were very different from the Brighton ones, looking like a different insect; they were mouse-coloured, with definite but not conspicuous markings, while those from Brighton were whitey grey in colour with very pronounced markings. Mr. R. C. Bradley, *Methoca melanocephala* (female), from Sutton, with an apterous ichneumon, *Aptesis nigrocincta* (female) which is remarkably like it in general appearance; he said that he had been informed that the ichneumon was a parasite on *Hybernia defoliaria.* Mr. J. T. Fountain, some good series of moths taken in the suburbs close to the busy parts of the town; they were *Calocampa exoleta*, *Cerastis spadicea*, *Miselia oxyacanthæ* with its var. *capucina*, *Anchocelis pistacina*, and *Phlogophora meticulosa*, long series of the last three.

December 19*th*—Mr. P. W. Abbott in the chair. Mr. R. Bradley exhibited a box containing a large number of Tortrices and various rare Lepidoptera, presented by Dr. P. B. Mason to the type collection of the Society. Mr. A. H. Martineau showed a specimen of *Sphinx convolvuli*, taken at Solihull recently. Mr. R. C. Bradley, *Chrysotoxum sylvarum* and *C. elegans*, both taken in the New Forest last Whitsuntide. Mr. A. H. Martineau, *Tachytes pectinipes*, male, from Cannock Chase, and female from Nevin, North Wales; also *Salius exaltatus* (females), *Nysson dimidiatus* (female), and *Entomognathus brevis* (female), all from Nevin. Mr. P. W. Abbott, a case containing a number of fine varieties of Lepidoptera taken by himself and others during 1898; he had himself been unusually fortunate in chancing on varieties; amongst others were the following:—a specimen of *Vanessa io* from South Devon, which was small, dark, and smoky looking, the disc of the wings appearing as if scraped, although all the scales were on, the scales themselves showing dull and colourless under the microscope; *Nonagria arundinis*, a fine dark-brown specimen from Norfolk, bred; *Venilia maculata*, one, from Wyre Forest, with dark brownish and yellow ground colour; *Rumia luteolata*, one, from South Devon, with dark mark right along costa of fore wings; *Hydrella palustris*, one of the so-called black ones, from Wicken; *Larentia viridaria*, one, taken by Mr. A. J. Hodges in South Devon, small and pale, with markings inconspicuous, the bar on fore wings narrow and broadly edged with white; *Zygæna filipendulæ*, one, with the outside spots confluent, from South Devon, also taken by Mr. A. J. Hodges; dark and obscurely marked *Zonosoma linearia*, bred, from Epping Forest, by Mr. A. J. Mutch; *Asphalia diluta*, from Wyre Forest, one small and dark, with outer half of outer band on fore wings missing, one with two bands confluent across discoidal spot on right wing only. Mr. E. W. Wynn also showed a nice lot of varieties, including a specimen of *Vanessa urticæ*, from Teignmouth, with white markings between black spots on costa, discal spots small, and hind marginal band edged with white; *Triphæna comes*, from Hepwar Wood, a beautiful specimen with strongly marked transverse lines on fore wings; dark *Polia chi*, from Chatsworth, &c.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

KENDAL ENTOMOLOGICAL SOCIETY.—*November* 14*th*, 1898.—Mr. J. Holmes in the chair, the President being unable to attend the first portion of the meeting. There were twenty-one present, and two new members were elected. The chairman made some interesting and instructive remarks upon the seasonable topic of pupa digging, a pursuit which needs constant encouragement, and which, even in this "bug paradise," is often most disappointing. A general discussion, in which the President and others joined, followed up Mr. Holmes's notes towards the close of the meeting. This part of the programme was felt to be of such practical value, especially amongst beginners, that it was there and then resolved to hold a fortnightly meeting of an informal nature during the winter months for entomological chat and discussion. Mr. J. Cragg exhibited an almost unicolorous specimen of *Hepialus velleda*, with one white mark on each fore wing. Mr. Graveson and Mr. Smith contributed cases of brilliant Indian Lepidoptera. Messrs. Holmes, Littlewood, Moss, and Wright exhibited autumn captures at treacle and light, including chiefly good series of *Calocampa exoleta*, *Scopelosoma satellitia*, *Cerastis vaccinii*, *C. spadicea*, *Xanthia ferruginea*, *Diloba cæruleocephala*, and one *Agrotis saucia*. Mr. Moss, three recently bred *Nemeobius lucina*. Mr. Wright, a series of *Arctia caia* (typical), which he had successfully reared from ova of the summer brood by forcing.

December 12*th*, 1898.—The President in the chair. Mr. Littlewood read an interesting and carefully prepared paper on "treacling," which opened many points for discussion, at the close of the business portion of the meeting, as to the best *modus operandi*. A hearty vote of thanks was unanimously accorded. It was decided that the Annual Meeting should be held in January, and that the President should at that meeting each year present an Annual Report, to be subsequently printed and distributed amongst the members, as a retrospect of the yearly proceedings of the Society. An informal meeting for entomological chat and discussion was held on Nov. 28th, and it was decided to continue holding meetings of this kind fortnightly through the winter months. Mr. Holmes and Mr. Littlewood exhibited recent captures; Mr. Graveson and Mr. Smith, cases of S. American Lepidoptera; and Mr. Moss, some 1898 spring Geometræ from Eastham and Delamere, and a drawer of Hepialidæ and Cossidæ.—A. M. Moss, *Sec.*

Carlisle Entomological Society.—*November* 17*th*, 1898 (at Tullie House).—Mr. G. B. Routledge in the chair. Mr. G. Wilkinson exhibited *Nephopteryx angustella* (bred from the fruit of spindle) and *Butalis chenopodiella*, both species from Surrey; *Sciaphila penziana* from Unst, and some Hybernias, including three specimens of *H. marginaria* var. *fuscata*, captured in the district. Mr. M. Dixon, varieties of *Melitæa aurinia*, and some Hymenoptera from the Carlisle district. Mr. F. H. Day exhibited a box of Coleoptera, including *Tropiphorus tomentosus* (*mercurialis*), *Barynotus mœrens*, *Erirrhinus bimaculatus*, from around Carlisle. Mr. G. B. Routledge, a fine specimen of *Acherontia atropos*, caught at Gett Hall, Castle Carrock, the residence of Judge Steavenson, on October 10th; also some Coleoptera from the same district, including *Quedius scintillans*, *Q. fulvicollis*, and a *Bembidium* with red spots on the elytra, which had been sent on to Mr. E. A. Newbery for determination, who, in returning it, said it was not *B. littorale* or *B. saxatile*, as it was too small, striæ too finely punctured for *B. littorale*, and the thorax is not transverse enough for *B. saxatile.* Mr. Newbery had specimens from the Swiss Alps, which were very similar, and which he had doubtfully referred to *Bembidium andreæ*, which so far has not been considered British. The specimen exhibited was taken on Castle Carrock Fell. Mr. G. Wilkinson read a paper on "Some aspects of Variation."

December 1*st*.—Mr. G. B. Routledge in the chair. Mr. F. H. Day exhibited Coleoptera taken in the county: *Carabus glabratus* from Honister Crag; *C. arvensis* from Styehead and Honister; *Pterostichus vitreus* from Styehead and Skiddaw; *Clythra* 4-*punctata* from Keswick; *Liophlœus nubilus*, *Melanotus rufipes*, *Corymbites pectinicornis*, *Campylus linearis*, from Carlisle district. Mr. J. E. Thwaytes, a series of *Agrotis nigricans* and *Epunda nigra*, which had been very abundant in the Carlisle district this year; also *Tæniocampa gracilis* and *Leptogramma literana*. Mr. Aitken exhibited Coleoptera—*Grypidius equiseti*, new to the local list, from flood refuse on the River Eden in 1896. Mr. Day read a paper, "Entomological Rambles on Mountain, Plain and Shore," mentioning the different species of Lepidoptera and Coleoptera he had come acoss in the Lake district, round Carlisle and at Silloth, in 1898.

December 15*th*.—Mr. John Wilkinson showed a series of *Chesias spartiata* taken in October among broom near Carlisle. It was very local, only occurring in two places. Mr. Mawson showed a specimen of *Amphidasys betularia* var. *doubledayaria* from Keswick, and he had taken another example near Penrith. This form appears to be rare in Cumberland, as very few specimens had come under the notice of the lepidopterists of the Society. In its typical form the species was familiar. The Secretary (Mr. Day) exhibited the following Coleoptera, all from the Cumberland coast:—*Bembidium saxatile*, taken by "swilling" on the banks of a stream; *B. æneum*, on mud-banks; *B. pallidipenne*, under seaweed, &c.; *Homalium rugulipenne*, under shore refuse; *Agabus femoralis*, from ponds; *Anomala frischii* and *Cleonus sulcirostris*, both taken among sandhills.—G. B. Routledge.

Entomological Club.—Since the last report (Entom. xxxi. 76), meetings of this Club were held as follows:—June 21st, 1898, at the residence of Mr. Samuel Stevens, Loanda, Beulah Hill, Upper Norwood. July 15th, at the 'Hand and Spear' Hotel, Weybridge; Mr. G. T. Porritt in the chair. Oct. 19th, at Stanhope, The Crescent, Croydon, the residence of Mr. T. W. Hall. Dec. 2nd, at the residence of Mr. R. Adkin, Wellfield, 4, Lingard's Road, Lewisham. Jan. 17th, 1899, at the Holborn Restaurant; Mr. G. H. Verrall in the chair.—R. South, *Hon. Sec.*

RECENT LITERATURE.

Contributions toward a Monograph of the Lepidopterous Family Noctuidæ of Boreal North America. A Revision of the Species of Acronycta (Ochsenheimer), *and of certain allied Genera.* By John B. Smith, Sc.D., and Harrison G. Dyar, Ph.D. 8vo, pp. 1–194, plates i–xxii. Washington, 1898 (Proc. U.S. Nat. Mus. vol. xxi.).

In this important paper will be found full descriptions of the North American species of *Acronycta* and allied genera, together with particulars of their earlier stages so far as they are known, and remarks on distribution, and other matters connected with the subject. There are also analytical keys to groups, genera, and species, to larvæ of the *Acronycta*, and a synopsis of groups.

Prof. Smith gives an account of the genus *Acronycta* and its allies, and Dr. Dyar furnishes one on the early stages of Acronyctids. Preceding the consideration of the species of each group in detail, there are some remarks on the special characters, resemblances, or affinities of the units of the group.

The revised classification of the species is based on a study of larval characters, as well as of imaginal structure, and it has been found that this arrangement agrees in the main with that proposed by Dr. Chapman, who founded his classification largely on pupal structure. *A. ligustri*, however, which is the type of Chapman's third section (*Bisulcia*), is rejected as not belonging to the Acronyctids.

The species referred to *Acronycta*, Ochs., are divided into seven groups, and the British species, with the exception of *ligustri* and *megacephala*, fall into three of these as follows:—

Group AMERICANA.—*A. leporina*, Linn.; *A. aceris*, Linn.

Group LOBELIÆ.—*A. psi*, Linn.; *A. tridens*, Schiff.; *A. strigosa*, Fabr.; *A. alni*, Linn.

Group AURICOMA.—*A. auricoma*, Fabr.; *A. rumicis*, Linn.; *A. myricæ*, Guen.; *A. menyanthidis*, View.

Leporina, which has been twice redescribed by American authors, is stated to be the only species of the genus common to Europe and North America. *Aceris* is somewhat similar in appearance to large specimens of *A. rubricoma*, Guen., and its position would seem to be between that species and *A. americana*, Harris.

Psi and *tridens* belong to the typical section of the Lobeliæ; *strigosa* is regarded as the European representative of *A. connecta*, Grote, and *alni* has relationship with the last named American species, and also with *A. funeralis*, Grote and Rob. Of *myricæ* and the European *euphorbiæ*, it is remarked that they bear the same relation to each other that *A. noctivaga*, Grote, does to *A. sperata*, Grote. *Auricoma* and *rumicis* are both closely allied to *A. impressa*, Walk. *Menyanthidis* appears to lack an American ally, while *megacephala* is "unique and utterly unlike anything represented in the American fauna." *Demas* and *Arsilonche* are retained as genera allied to *Acronycta*.

All the plates are plain, and the first seven are reprints of a chromo set that was prepared for a publication of the Department of Agriculture which it was intended to issue in 1885, but which was never brought out. These coloured plates are also enclosed with copies of Prof. Smith's paper sent to entomologists.

Apart from its value as an authoritative guide to the study of the Acronyctids of North America, the paper will be of great interest to all lepidopterists who are concerned in the work that has been done in the recent past, and is still being carried on, by systematists in preparing a substantial foundation upon which may be built up an approximately permanent system of classification of the Lepidoptera.

Übersicht der Lepidopteren-Fauna des Grossherzogtums Baden (und der anstossenden Länder). Von CARL REUTTI. Zweite Ausgabe, herausgegeben von A. MEESS und DR. A. SPULER. 8vo, pp. xii, 361. Berlin: Verlag von Gebrüder Borntraeger. 1898.

THIS summary, or catalogue, of the Lepidopterous Fauna of the Grand Duchy of Baden was first published in 1853, and in the edition before us the subject has been brought up to date so far as concerns the entry of species known to occur in the area dealt with. These we find are 2568 in number, nearly half of which belong to the Tineæ.

The main divisions are as follows:—Diurna, 133; Sphinges, 58; Bombyces, 135; Noctuæ, 403; Geometræ, 331; Pterophoridæ, 41; Alucitidæ, 6; Pyralides, 187; Tineæ, 1274.

With some few exceptions the arrangement of families is pretty much the same as that adopted by Staudinger and Wocke (Cat. Lep. Eur. Faun.), but the Diurna are grouped in two sections—A, Rhopalocera; and B, Netrocera. In the latter are placed all the species usually referred to Hesperiidæ, and all other species are included in the first section.

The Cossidæ are retained among the Bombyces, but on p. 182 the position of this family immediately before the Tortricoidæ in Tineæ inaculeatæ is indicated, and this, the first subdivision of the Tineæ, also embraces Psychidæ, "Tortricina," and a large number of families of "Tineina." In Aculeatæ, the second subdivision of Tineæ, the families are Incurvaridæ, Tischeriidæ, Nepticulidæ, Micropterygidæ, and Eriocephalidæ. Hepialidæ, corrected to Epialidæ, constitutes the third subdivision of Tineæ.

Pterophoridæ and Alucitidæ are located between the Geometræ and the Pyralides, and there are some changes in the arrangement of the families and genera in the latter division. Thus, for example, *Scoparia* is included in the Botydæ, and this family is interposed between the Crambidæ and the Phycideæ.

In addition to localities for each species, there are notes referring chiefly to the time of appearance of the imago and the food-plant of the larva.

L'Apiculture par les Méthodes simples, par R. Hommell, ingénieur agronome, professeur d'Agriculture à Riom. 8vo, pp. 338, with 6 plates and 102 figures in the text. Paris: Georges Carre et C. Naud. 1898.

Judging from the elaborate manner in which the book has been prepared, and the clear and explicit instructions furnished, M. Hommell's work should prove exceedingly valuable not only to those who may be contemplating the establishment of an apiary, but the experienced bee-keeper will find a large amount of information connected with all phases of the subject.

The following papers appear in American publications:—

Proceedings of the U. S. National Museum. Vol. xxi. Washington, 1898:—

"On some New Parasitic Insects of the Subfamily Encyrtinæ." By L. O. Howard, Ph.D. Pp. 231–248.

"On the Coleopterous Insects of Galapagos Islands." By Martin L. Linell. Pp. 249–268.

"Report of a Collection of Japanese Diptera." By D. W. Coquillett. Pp. 301–340.

"American Oniscoid Diplopoda of the Order Merocheta (Myriapoda)." By O. F. Cook. Pp. 451–468, plates xxix–xxxii.

"Japanese Hymenoptera of the Family Tenthredinidæ." By C. L. Marlatt, M.S. Pp. 493–506.

Proceedings of the American Academy of Arts and Sciences. Vol. xxxii.:—

"A Contribution to the Study of Individual Variation in the Wings of Lepidoptera." By William L. W. Field. Pp. 389–396.

OBITUARY.

William Burgess Pryer, whose death is announced at Port Said on January 7th, was born on March 7th, 1843. In his earlier days he was an enthusiastic collector of British Lepidoptera. About 1860 he went out to China in connection with the silk and tea house of his relatives Messrs. Thorne Bros., Shanghai, where he remained for twelve years, and devoted considerable attention to collecting the Lepidoptera, of which very little was then known. An account of an expedition he made to the wonderful Snowy Valley appeared in the 'Entomologist's Monthly Magazine,' vol. xiv. Among the results of his work in China was the discovery of many new species, which were described by Messrs. Butler, Moore, and others, and a few by himself in a paper in the 'Cistula Entomologica,' vol. ii. The collection he formed there afterwards passed into the possession of Messrs. Salvin and Godman and the British Museum. After a short experience of business in London he started, in 1877, for North Borneo, and was one of the pioneers of the British North Borneo Company, which founded the new colony at Sandakan. He was appointed British Resident in 1878, and subsequently the British Consular Agent. During the first few years of his residence there, he formed considerable collections of both Lepidoptera and Coleoptera, and wrote several accounts of journeys he made into the interior. His increasing duties in connection with the development of the newly-acquired territory prevented him, however, from doing much in his favourite pursuit of entomology during the last few years. Owing to failing health, he decided to return to England on sick leave; and on the passage home more serious symptoms of his illness necessitated his detention at Port Said, where he succumbed within a few weeks of his arrival. His genial and generous disposition made him many friends who will feel his loss; and his remarkable tact and courage in dealing with the rebellious natives, among whom he proceeded on the occasion of several hostile outbreaks, practically unarmed, was a great factor in the success which has attended the extension of British rule over the large region of North Borneo. He was the elder brother of Mr. H. Pryer, well known in connection with Japanese Lepidoptera, who died in 1888; and was a corresponding member of the Zoological Society since 1880.—O. E. J.

THE ENTOMOLOGIST

Vol. XXXII.] MARCH, 1899. [No. 430.

BRITISH LEPIDOPTERA.*

Having revised some small portions of this book, where my own work was referred to, I am probably in an appreciable degree prejudiced for and against it in various particulars; but as this is the normal condition of most reviewers, it is perhaps hardly necessary thus to refer to it. One's first impression before opening the book is a doubt as to the necessity for more systematic works on British Lepidoptera at present. We have recently had Meyrick's useful and comprehensive volume, and Barrett's ponderous tomes are continually increasing on our shelves, whilst the less aspiring, but very often admirable, little handbooks, of which Mr. Tutt himself is not one of the least prolific authors, are endless. Though the doubt may remain in some of its aspects, there can be no question that the present volume covers a somewhat, I might almost say a quite, unoccupied field. The next impression is as to the gigantic amount of work involved in the whole work if it is ever to be completed. This large volume deals with only eighty species. Man is mortal, but this volume, with Hampson's and Barrett's works, remind us strongly that no man believes he himself is.

The volume begins with nine chapters (112 pages) of general matter concerning the structure of Lepidoptera at all stages, and their varieties, protective resemblances, &c. The author, in fact, incorporates in a series of special essays the leading facts that have been published during the past twenty or thirty years by Dyar, Scudder, Poulton, Dixey, Speyer, Walter, Packard, Hampson, and a host of others. Many of these chapters are very full, especially those treating of the larvæ, both as to their internal and external anatomy, and their various modifications for protective and defensive purposes. Not only have we here a great gathering of facts from various sources, but they are treated and marshalled by the author with much philosophical insight, and with the addition of new material of his own, and obviously very frequently a verification by actual observation of the facts quoted from other authorities.

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* 'A Natural History of the British Lepidoptera: a Text-book for Students and Collectors.' By J. W. Tutt, F.E.S. Vol. i. pp. 560. London, 1899.

The discussion of Dyar's work on larval tubercles, and of Packard's tabulation of the forms into which they are modified, will be very useful to those who are unable to study the scattered papers in which these are published, and will be materially assisted by the critical views of the author.

The discussion of the meaning and use of the special structure of the geometrous larva states some interesting and, I think, original views of the author, which appear to be so conformable to the facts that they may be provisionally accepted. He points out that the Geometer as a tree-feeder is specially fitted to travel quickly, and so shorten the periods during which it loses by movement its protection by resemblance to a twig, mid-rib, &c. The tree-feeders amongst the Sphinges, Saturnids, &c., obtain their protection by moving with extreme slowness, as well as by terrifying attitudes, &c. The young *Noctua* larvæ that are geometrous are shown to have very similar necessities to the tree-feeding Geometers, and have independently made an approach to the same structure.

We altogether miss any serious account of the imaginal structure, and there is little or no reference to neuration. Though the author nowhere gives a hint to that effect, we conclude that these will form the subject of the general chapters in some future volume. The materials to be collated and philosophically considered are still no doubt meagre; Bodine, Reuter, Jordan, and others are, however, getting series of facts together. Neuration, which has held systematists so largely its worshippers, has had no formal treatment since Spuler's investigations, until Comstock and Grote's more recent monographs. Still, for practical classificatory purposes, a large mass of information seems to be in the hands of many persons who tell us nothing, except what we can gather from the use they make of it. A comprehensive essay on the subject is much to be desired. Our author's silence is perhaps to be interpreted as the result of a desire to give a rest to an overworked aspect of his subject. The great value of this part of the work is that it brings together in readable form a mass of information only to be got from a multitude of different sources. The same feature marks equally the rest of the work dealing with families and species. It involves a great mass of matter, which is an evil, but it brings together in notes on life-history, structure, and especially on habitats and date of occurrence, an immense number of facts, culled from transactions, magazines, and other sources, which must have involved enormous labour to the author, and will save just so much to anyone who wants to know them—either the "mere collector" who desires information as to when and where he must go for his specimens, or the student of geographical distribution or of life-histories. Each species is treated of under the headings of Synonymy (often half a page of closely printed references), Original Descriptions, Imago, Variations, Comparisons with Allied Species, Ovum, Habits of Larva, Larva (with subheadings), Cocoon, Pupa, Food-plants, Habits and Habitats, Times of Appearance, Localities, Distribution.

The most valuable and original division of this portion of the work is the section on the Anthroceras. This is a very full discussion of our British representatives and the allied continental species and varieties, a subject of which Mr. Tutt has made a special study, and amounts to an exhaustive monograph of the group. With regard to the *Trifolii*, *Lonicerœ*, *Filipendulœ* section, it would appear that there are here one, two, three, or four species, or even many more, according to the test one accepts of what a species is; that there is great plasticity throughout the group, with a strong tendency to form local races according to locality or food-plant. These races are often very puzzling as to what species they are forms of, or whether they are distinct species. The matter is a very complicated one, which the author has done much to unravel, and towards indicating the necessary lines for further investigation.

The account of the Nepticulæ is also of great value, as it incorporates much material which is referred for authority to Fletcher and Wood, which there is much reason to believe would have largely escaped publication had not our author induced these authorities to assist him.

Amongst the *Nepticulœ* there is described a new species under the name of *N. fletcheri;* this insect has hitherto been confounded with *N. anomalella*, but its distinctness has been established by the work of Mr. W. H. B. Fletcher, in compliment to whom it has received its name. *Anomalella* is a red-headed insect attached to *Rosa canina* and sundry garden roses, whilst *fletcheri* has a black head, and has *R. arvensis* as its more especial food-plant. When once the distinction is seized, there is abundant difference to be detected in all the stages, and in the outline of the mine and the disposal of the frass within it.

The author's classification and arrangement will no doubt meet with even more objection than Mr. Meyrick's did. The chief but really unimportant objection will be that it mixes up insects of all sizes, and makes cabinet arrangement of specimens a painful problem. This is really all nonsense; a cabinet arrangement must be linear, no natural arrangement is. Therefore, so long as each group or family is kept together, and one knows where to find them, it is quite immaterial in which order the families follow each other in the collection.

Meyrick begins at the top and works downwards, Tutt begins at the bottom and works upwards; and, so far as meeting old time prejudices goes, Meyrick is decidedly the wiser in his generation. Had he only twisted the stirps containing the butterflies to the front, he might perhaps have entirely avoided the opposition a new arrangement meets with. Tutt begins at the bottom, and flaunts this difficulty in our faces; perhaps he feels that he will disarm the danger by boldly grasping his nettle.

The phylogenetic tree given at p. 112 embodies so many points that I have myself insisted upon, that it would be ungrateful to criticise it. By adopting the form of an actual tree with a thick stem, as all good trees ought to have, some difficulties are avoided; for instance, I might claim that it adopts my view of the probably polyphyletic origin of the neo-Lepidoptera; it might equally be said that it does not. An uncertainty of this sort, considering the paucity of conclusive facts, is perhaps praiseworthy rather than otherwise. Eupterotidæ and Psychidæ are placed twice over tentatively. I should certainly agree with that that assigns the Psychidæ to the Tineid branch. Though there are several positions about which I am sceptical, such as that of the Drepanulidæ and Pterophoridæ, there are none that appear to be impossible, that is, no position given requires, as far as my knowledge goes, that any structure should have evolved backwards, if an awkward phrase may be used to express an awkward hypothesis. The process is one the impossibility of which in nature is clearly brought home to us by a familiar device of the cinematographist, when, by reversing his apparatus, the scattered feathers, for example, after a pillow-fight, collect themselves together and return into the pillow-case from which they had issued.

One may wish the work could have been less voluminous, but there can be no doubt it marks an important step forward in the treatment of the British Lepidoptera, recognising more fully than any previous treatise that a complete study of all the stages of the insects, not only structurally, but physiologically, in their habits, changes, variations, distributions, &c., is now essential to further progress. The groups selected for treatment lend themselves especially to this demonstration.

The work is produced in a very satisfactory form. I have no doubt that its merits will secure it a reception that will induce the author to proceed with the remaining volumes.

T. A. C.

NOMENCLATURE—PHYLOGENY—SYNONYMY.

By J. W. Tutt, F.E.S.

There are many interesting matters in the 'Entomologist' this month (No. 429, February) relating to the Phylogeny and Synonymy of the Lepidoptera, of which the paper by Mr. South on "The Nomenclature and Arrangement of British Butterflies" is not the least so. The arrangement of the British butterflies, if original and not carried out on some previously arranged list, as is generally the case (certainly so in some of the works compared by Mr. South), includes, or rather illustrates, the author's opinion of the phylogeny of the group. What we want is not so much a comparison of authors' (? book-makers') *opinions* on nomenclature, as a critical comparison, based, say, on the Merton rules of nomenclature, and their application to the names in use. This would give us at least a standard for our few British butterflies. I am not aware that anyone except Scudder, Kirby, and Grote have so studied our species, and most of their differences should be easy of settlement. The list published by Mr. South itself shows that, with the exception of *Erebia æthiops*, *Cœnonympha tiphon*, *Polyommatus astrarche*, *P. icarus*, *P. bellargus*, *Nomiades semiargus*, *Cupido minima*, *Syrichthus malvæ*, *Thymelicus thaumas*, and *Carterocephalus palæmon*, there are no points of issue as to specific names. The agreement of Meyrick and Tutt (who at least have attempted to apply the law of priority) in the case of *Erebia æthiops*, *Cœnonympha tiphon*, *Polyommatus astrarche*, *P. icarus*, *P. bellargus*, *Nomiades semiargus*, *Cupido minima*, *Syrichthus malvæ*, *Thymelicus thaumas* (which, by the by, has a much older synonym), and *Carterocephalus palæmon*, in which they agree with the 'Entomologist' list, throws the onus surely of proving their incorrectness on Mr. Barrett (who disagrees with them), Mr. Newman's book* being now nearly thirty years old, and certainly not to be included fairly in Mr. South's title of being written by a "recent author"; and the matter of whether *minima* or *alsus*, *malvæ* or *alveolus*, *thaumas* or *linea*, *palæmon* or *paniscus* should be applied would surely not prove a very difficult subject of enquiry.

It is in the matter of genera, however, that authors "run amuck." I have already formulated my opinions in a paper read before the South London Entomological Society in 1897, as to what genera are, and on what data they should be based. This paper has never been seriously criticised by any of the authors who prefer to follow the old lists, and one can only suppose that they have no objection to its principles, or are too lazy to test its correctness, or think it beneath contempt. Neither opinion matters much, but those who wish to see a rational method of genera adopted must certainly dissociate the large tribal groups, now masquerading as genera, by the application of characters derived from the eggs, larvæ, pupæ, and imagines; and if this be done the proper generic application must be obtained on similar lines to those of species. My off-hand criticisms of the difference of genera noticed would be—*Anthocharis* used by Barrett, *Euchloë* used by Meyrick and Tutt; *Anthocharis* belongs to a group of entirely different structure from that of *Euchloë*. *Leptidia*, used by Grote, is a matter of priority; probably Grote's name has priority over *Leucophasia*. *Colias* and *Gonepteryx*, a matter of application of types; *Colias* being applied to *rhamni*, and the next available name *Eurymus* being used for the "clouded yellows." *Argynnis* is a tribe, not genus, and structurally differentiable into many genera, of which we have at least three (perhaps four)—*Brenthis* (*selene* and *euphrosyne*), ? *Issoria* (*lathonia*), *Argynnis* (*aglaia* and *adippe*), and *Dryas* (*paphia*). The same holds good of *Vanessa*, *Erebia*, *Epinephele* (as used by Staudinger), *Thecla*, *Polyommatus*, and *Hesperia*. What one wants here are a comparison of the terms used by Grote, Kirby, and Scudder, and a critical discussion of the differences by a competent specialist.

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* In the List of British Butterflies (*ante*, p. 32) Newman was cited to show that his arrangement did not differ in any material respect from that of Meyrick.—R. S.

Arrangement depends upon phylogeny. The data for our present knowledge of the phylogeny has been given us by Scudder, Chapman, Reuter, and others during the last ten years. The arrangement of the old lists was the phylogeny so far as the imagines gave superficial characters. Any arrangement based on these old lists, therefore, has nothing in common with the modern notions of phylogeny (*i. e.* relationship), *e. g.* according to Mr. South's list, Mr. Barrett places the Lycænidæ next the Pieridæ; Dr. Chapman has shown that the former are a very distinct branch of the butterfly stem connected somewhat closely with the Limoniidæ, whilst the Nymphalids, which are closely united with the Pierids, are separated by Mr. Barrett by the major part of the fauna from each other. These are some of the off-hand suggestions that occur to me. The arrangements, therefore, of Newman and Barrett (and, may I add, of the 'Entomologist List'), are certainly not arrangements at all on recent phylogenetic work, and do not reflect the work and conclusions of "recent authors." The lists published by Scudder, Reuter, Chapman, Grote, &c., would reflect such conclusions, and a comparison of these would be of the highest value.

There are other points that arise in looking through the 'Entomologist.' On p. 31, Mr. Kirby records "*Zygæna*" *phegea* as being taken at Wei-Hai-Wei. Now, *phegea* is a specialised Syntomid (Arctiid). On p. 26, Dr. Chapman congratulates Sir George Hampson for "rescuing the Syntomidæ from their traditional but absurd place beside the Zygænas (*Anthrocera*), and placing them with the Arctiidæ and Noctuidæ." Now, whether Dr. Chapman wrote "Zygænas" or not in his original paper matters little (although if this had been struck out and the more correct *Anthrocera* had stood alone, it would have taken away the point of this criticism), but here we have on p. 26 and p. 31 two entirely different uses of the term *Zygæna* by eminent specialists, one applying it to one of the highest groups of the Arctiid or Syntomid stirps, the other to the generalised Anthrocerid stirps, just as far away from each other in real relationship as two moths very well can be. As bearing on this point, I see I am credited (pp. 42 and 43) with exhibiting certain species of "*Zygæna*" at the South London Entomological Society's meetings of Nov. 24th, 1898, and Jan. 12th, 1899. Now, for many months I have been making a very special study of these moths, and I am certain that I have never used the name "*Zygæna*" personally for these moths for a considerable time, as I always now apply the term *Anthrocera* to avoid confusion. At any rate, the point is this—the *Zygæna phegea* (p. 31) and the *Zygæna trifolii* (p. 42) bear infinitely less relation to each other than, say, *Sphinx ligustri* and *Saturnia pavonia*, which are at least members of the same stirps.

In conclusion, I do not ask for an uniform code. That I know is impossible, and my private opinion that "synonymy is of the devil" has already been quoted in this magazine. Entomologists of the old school do not follow the modern expansion of the science, and to these the work of Chapman, Reuter, Packard, and Dyar is not acceptable. Others, again, do not know anything about the work of these men, and will always send their lists of captures, named according to any book (out of date or otherwise) that they may have; but I do ask that in matters of importance, such as that of *Zygæna* mentioned above, the same name be not applied to insects belonging to two entirely different stirpes of the Lepidoptera. Let us call the Burnets *Anthrocera* and the Syntomids *Zygæna*, or the Burnet *Zygæna* and the Syntomid *Syntomis*, but not both the Burnet and Syntomid *Zygæna*. If Mr. Kirby is right about the naming of "*Zygæna phegea*," then Dr. Chapman's criticism shows that the Burnets want another name to separate them absolutely from the Syntomids in question.

THE NOMENCLATURE OF BRITISH LEPIDOPTERA.

For some years past the North London Natural History Society has officially recognised the 'Entomologist Synonymic List' as its authority for the nomenclature of the Lepidoptera; but as so many changes have subsequently been proposed by

Mr. Kirby and others, it was found desirable some time ago to appoint a special Nomenclature Revision Committee, consisting of Messrs. Nicholson, Robbins, Woodward, and Prout, to investigate these changes, and recommend the adoption of such as they found to be incontrovertibly correct. The first revision of the Macro-Lepidoptera has now been completed, and adopted by the Council; no claim is made of finality, and indeed many of Kirby's generic changes—such as the resuscitation of names from Hübner's 'Verzeichniss,' which contains so many "mixed genera"—have been left untouched until more biological work has been done at the question of natural genera; and some necessary changes also have been deferred until some recognised British authority has brought them before the notice of the entomological public in this country.

The following is the list of alterations from South's 'List' (which is still to form the basis of the Society's nomenclature) thus far adopted. The references give a brief indication of the literature consulted in sifting the questions raised, but is of course very far from exhaustive, one or two references to accessible works being made to suffice; whereas in the work of the Committee it was frequently necessary to verify quotations by consulting the original descriptions, &c.:—

1. The generic grouping and nomenclature of the Rhopalocera to follow Tutt's 'British Butterflies,' with the few exceptions noted below.

2. *Adopæa*, Billb. (1820), to replace *Thymelicus*, Hb. (Kirby, Handb. Lep. iii. 19).

3. *Plebeius argus*, Linn., for *ægon*, Schiff.; *P. argyrognomon*, Bgstr., for *argus*, Auct., not yet recorded as British (Kirby, Handb. Lep. ii. 88, 89).

4. *P. alexis*, Scop. (1763), for *astrarche*, Bgstr. (*l. c.*, p. 99).

5. *Pontia*, Fb. (1807), *daplidice*, for *Pieris daplidice* (*l. c.*, p. 151).

6. *Leptidia*, Billb. (1820), for *Leucophasia*, Steph. (*l. c.*, p. 178).

7. *Erippus*, Cram., var. *menippe*, Hb. = *archippus*, Fb., *nec* Cram. = *plexippus*, Scud., *nec* Linn., for *archippus*, Fb. (Kirby, Entom. xxix. 189).

8. *Satyridi* and *Satyrus*, Latr., for *Hipparchiidi* and *Hipparchia*, Fb.; *Hipparchia*, Fb., for *Enodia*, Hb. (Kirby, Handb. Lep. i. 131; South, Entom. xxx. 275; Moore, Entom. xxx. 326).

9. *Lineata*, Fb., to be deleted as synonym for *Deilephila livornica* (Kirby, Hand. Lep. iv. 28, 30).

10. *Amorpha*, Hb., *populi*, L., for *Smerinthus populi* (*l. c.*, p. 58).

11. *Dilina*, Dalm., *tiliæ*, L., for *S. tiliæ* (*l. c.*, p. 56).

12. *Hemaris*, Dalm. (1816), for the separation of the bee-hawks from *Macroglossa stellatarum* (Kirby, Handb. Lep. iv. 4).

13. *Fuciformis*, Linn., and *tityus*, Linn., for the species of *Hemaris*, as indicated in Entom. xxix. 39.

14. *Ægeriidæ* for *Sesiidæ; Ægeria*, Fb. (1807), for *Trochilium*, Scop.; and *Trochilium*, Scop. (1777), for *Sesia*, Fb. (Kirby, Handb. Lep. v. 284–290).

15. *Anthrocera*, Scop., for *Zygæna*, Fb. (*op. cit.*, iii. 86).

17. *Purpuralis*, Brünn (1764),* for *pilosellæ*, Esp. (*tom. cit.*, p. 97).

18. *Œnistis*, Hb., as generic name for *quadra*, L. (*tom. cit.*, p. 161).

19. *Phragmatœcia*, Newm. (1840), for *Macrogaster*, Dup., *nom. præocc.* (*op. cit.*, iv. 144).

20. *Porthetria*, Hb. (?1822), for *Ocneria*, H.S. (*op. cit.*, iii. 197).

21. *Pavonia-minor*, L., for *pavonia*, L. (*op. cit.*, iv. 105).

22. *Habrosyne*, Hb. (1822), as generic name for *derasa*, L. (*op. cit.*, v. 4).

23. *Ocularis*, L.,† for *octogesima*, Hb. (Tutt, Brit. Noct. i. 3).

24. *Apatelidæ* for *Acronyctidæ;* generic nomenclature just as in Entom. Rec. viii. 37.

25. *Paludis*, Tutt, Entom. xxi. 308 (1888), to be inserted as a subspecies in *Hydrœcia*, after *pictitans*, L.

26. *Xylena*, Hb. (?1810), for *Xylophasia*, Steph. (Grote, Entom. Rec. vi. 285).

27. *Pabulatricula*, Brahm. (1791), for *connexa*, Bkh. (Tutt, Brit. Noct. i. 86).

28. *Ypsilon*, Rott. (1776), for *suffusa*, Bkh. (Tutt, *op. cit.*, ii. 158).

29. *Primulæ*, Esp. (1788), Bkh., for *festiva*, Hb. (Werneburg, Beitr. ii. pp. 44, 177).

30. *Nænia*, Stph., as generic name for *typica*, L. (Tutt, Brit. Noct. iv. 40).

31. *Cerasi*, Fb. (?1775; 1781), for *stabilis*, View. (Kirby, Handb. Lep. v. 49).

32. *Fissipuncta*, Hw., for "*Orthosia*" *upsilon*, Bkh., *nec* Rott. (Tutt, Brit. Noct. ii. 158).

33. *Dyschorista*, Led., as generic name for *fissipuncta* and *suspecta* (*l. c.*, pp. 156, 158).

34. *Helvola*, L., for *rufina*, L. (*l. c.*, p. 162).

35. *Glæa*, Hb. (?1810), for *Cerastis*, Ochs. (Kirby, Handb. Lep. v. 52, 53).

36. *Ligula*, Esp., for *spadicea* of South's 'List' (Tutt, Brit. Noct. iii. 4).

37. *Citria*, Hb., *Tiliacea*, Tutt, and *Mellinia*, Hb., for *Xanthia;* the species being distributed as in Entom. Rec. viii. 17, but with ? as to position of *aurago*.

38. *Icteritia*, Hfn. (1767), for *Citria fulvago*, L., *nec* Cl. (Kirby, Handb. Lep. v. 58).

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* Kirby gives 1776; but the species was first named in Pontoppidan's 'Danske Atlas' in 1764.—L. B. P.

† Linné's type confirms this traditional interpretation.—L. B. P.

39. *Lutea*, Ström. (1783), for *Citria flavago*, Fb. (Entom. Rec. ii. 224).

40. *Xanthia*, Hb. (? 1810), for *Cosmia*, Ochs. (Entom. Rec. viii. 17).

41. *Cosmia*, Hb. (? 1810) for *Calymnia* (Kirby, Handb. Lep. v. 60).

42. *Conspersa*, Esp., for *nana*, Rott. (Tutt, Brit. Noct. iii. 36, 37).

43. *Diphthera*, Hb. (? 1810), for *Agriopis*, Bdv. (Kirby, Handb. Lep. v. 65).

44. *Hyppa*, Ochs., as generic name for *rectilinea* (Tutt, Brit. Noct. iii. 95).

45. *Lithophana*, Hb. (? 1816), for *Xylina*, Ochs. (Grote, Entom. Rec. vi. 30).

46. *Scoliopteryx*, Germ. (1810), for *Gonoptera*, Latr. (Tutt, Brit. Noct. iii. 97).

47. *Erotyla*, Hb. (? 1810), for *Agrophila*, Bdv. (Kirby, Handb. Lep. v. 86, 87).

48. *Olivana*, Schiff. (1776), for *argentula*, Esp. (*l. c.*, p. 92).

49. *Anthophila*, Hb. (? 1810), for *Thalpochares*, Led. (*l. c.*, p. 97).

50. *Lars*, Hb. (? 1810), for *Uropteryx*, Leach (*l. c.*, p. 201).

51. *Ennomos*, Tr., for *Eugonia*, Hb., *nom. præocc.* (*l. c.*, p. 208).

52. *Bistortata*, Goetze, for *biundularia*, Bork., = *laricaria*, Dbld. (Prout, Entom. Rec. viii. 76).

53. *Cyclophora*, Hb.* (? 1810), for *Zonosoma*, Led. (Kirby, Handb. Lep. v. 223).

54. *Testaceata*, Don., for *Asthena sylvata*, Hb., *nom. præocc.* (Staudinger, Cat. p. 190).

55. *Interjectaria*, Gn., for *Acidalia dilutaria*, Auct. (Prout, Entom. Rec. vii. 124).

56. *Spilota*, Hb. (? 1810), for *Abraxas*, Leach. (Kirby, Handb. Lep. v. 241).

57. *Denotata*, Hb., for *campanulata*, H.-S. (Heinemann, Schmett. Deutsch. i. 802; Entom. Rec. vii. 249).

58. *Chloroclystis*, Hb. (? 1822, as genus for *coronata*, *rectangulata*, and *debiliata* (Meyrick, Handb. pp. 182, 183).

59. *Gymnoscelis*, Mab. (1869), as generic name for *pumilata* (*l. c.*, p. 183).

60. *Sexalata*, Retz. (1783), for *sexalisata*, Hb. (Werneburg, Beitr. i. 193).

61. *Furcata*, Thnb. (1784), for *sordidata*, Fb. (Prout, Entom. Rec. ix. 86).

62. *Autumnalis*, Ström. (1783), for *trifasciata*, Bkh. (Entom. Rec. ii. 224).

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* Hulst (Trans. Amer. Ent. Soc. xxiii. p. 300) considers this name preoccupied in Mollusca. But as the form there used was *Cyclophorus*, both can stand; *vide* Walsingham & Durrant, 'Merton Rules,' No. 23.—L. B. P.

63. *Rheumaptera*, Hb. (? 1810), as generic name for *hastata*, L. (Kirby, Handb. Lep. v. 249).

64. *Implicata*, Vill. (1789), for *montanata*, Bkh. (Prout, Entom. Rec. vii. 249).

65. *Spadicearia* (Schiff.), Bkh. (1794), for *ferrugata* (? Cl.), Haw. (Meyrick, Handb. p. 229).

66. *Ferrugata*, L. (1761), for *unidentaria*, Haw. (*l. c.*, p. 229).

67. *Pyraliata?* (Fb.), Bkh. (1794), for *dotata* of South's 'List' (Prout, Entom. Rec. ix. 201).

68. *Ortholitha*, Hb., for *Eubolia*, Dup. (Tutt, Brit. Moths, p. 284).

Louis B. Prout, *Hon. Sec.*

246, Richmond Road, N.E.:
February 4th, 1899.

DRAGONFLIES IN 1898.

By W. J. Lucas, B.A., F.E.S.

In several respects the dragonfly season of 1898 was of more than ordinary interest. Though of a different nature, the late, ungenial spring had its effect on these insects as on the Lepidoptera and other orders. Owing to the fact that during the winter, except in the coldest weather, the nymphs are more or less active, and may perhaps feed to some extent, a cold spring would not of itself harm them so long as it was possible to put off the final change. Some of the early species certainly tried to appear soon after their proper time; whether many did so and perished, I cannot say—probably not, though perhaps one or two of the earlier species seemed less common than usual.

Whereas in early seasons *Enallagma cyathigerum*, *Pyrrhosoma nymphula*, *Brachytron pratense*, *Libellula depressa*, and *L. quadrimaculata* appear at the end of April, in 1898, except for an odd specimen here and there, they were a month later. I saw two specimens of *E. cyathigerum* on May 18th, and they continued increasing from that date, but were hardly well out till early in June. As regards *P. nymphula*, I found an empty nymph-case on May 8th, but did not see an imago till May 21st; this species also began to be plentiful early in June. Except for an empty nymph-case on May 28th, *B. pratense* escaped me altogether; nor did I meet with *L. depressa* except on July 2nd, and perhaps again on Aug. 11th. A single specimen of *L. quadrimaculata* was certainly taken on May 11th, but I did not find it common till June 5th.

Towards the end of June the later dragonflies began to put in an appearance at the proper time, unaffected apparently by the prolongation of the cold weather, and in consequence the times of certain species overlapped more than they usually do. The season thenceforward was a most satisfactory one, and owing to the fine autumn was late in closing. The last dragonfly I saw was on the wing in Richmond Park, on Oct. 23rd, and the species was *Sympetrum striolatum.* In 1897, however, I saw it at Esher as late as Nov. 14th, and I have no doubt that, had I sought for it, this species, if not others, might have been taken at least as late this year.

Orthetrum cancellatum was received from a new locality between New Malden and Kingston in Surrey. A female *Anax imperator*, with blue abdomen, was taken as late as Aug. 10th in the New Forest. The capture of a male *Lestes sponsa* at the Black Pond, near Esher, on Oct. 2nd, adds yet another to the list of species found at that prolific locality. At the beginning of August *Orthetrum cærulescens* was particularly common in the New Forest, especially over marshy ground, and I received the species for the first time from Surrey.

In the New Forest, on July 30th, and during the early days of August, *Agrion mercuriale* was common in the locality referred to in 1897, and it was traced to another centre, where, owing to the nature of the place, it will probably be well able to hold its own. Out of some 100 or 150 insects perhaps that were noticed, but a small proportion were females.

Near Sandwich, in Kent, towards the end of August, for the first time I made acquaintance with *Sympetrum sanguineum*, a rather small bright crimson dragonfly, much constricted at the base of the abdomen, and dilated towards the extremity. It skips about from plant to plant along the ditches, and, though rather jerky and restless, was not difficult to secure. It was, however, rather worn. On Sept. 9th I took a male at Wisley Pond, in Surrey, making a new record for the locality, and an empty nymph-skin found there on July 16th may belong to the same species. Others were taken at previously unrecorded localities in the south-east of England, the fact pointing possibly to a small immigration.

On Aug. 22nd, a very hot morning, as I was making my way towards the sand-hills near Sandwich, a blue-bodied dragonfly settled on some reeds by the side of one of the numerous streams. Thinking it was a late *L. depressa* or *O. cancellatum*, I approached it, and made an easy capture. Judge of my delight when I found that it was neither of those insects, but *Libellula fulva*—a male with the full blue colouring—though rather a worn specimen. This, however, mattered little, seeing that I have only been able to find six previous localised records of its capture, and these generally as single specimens, though a few other specimens unrecorded, and sometimes not localised or dated, are to be found in collections.

After patiently watching for a long time, I managed, on

Sept. 12th at Wisley Ponds, to capture a male *Æschna mixta.* This small *Æschna* is accustomed to fly rather high round the fir-trees, and so seldom gives one a chance to come within striking distance. It is a pretty insect, the markings being particularly bright and distinct; moreover, if it is eviscerated, it fades but little. Though it was rather plentiful in 1898 in a certain locality near the east coast, and appeared to be represented by not quite solitary specimens in two localities in Surrey, yet I fear it must be looked upon as quite an uncommon insect.

On Sept. 9th I paid a visit to Wisley Ponds, and after a time noticed a small dull-reddish dragonfly, distinct amongst the specimens of the common *Sympetrum striolatum.* On capturing one it was found to be a male *S. flaveolum.* On that day and the 12th I took several specimens, all of which were males. It is a small *Sympetrum*, whose flight is not long sustained, but resembles that of *S. sanguineum.* When captured it may be easily recognised by the fact that the basal third (sometimes more or less) of the hind wings and a part of the fore wings are suffused with bright saffron. Another was seen later near Elstead, in Surrey; while a capture was made near Oxford, and another near Colchester. In all probability they formed part of a migration into this county, for this species seldom, if ever, breeds here.

On previous occasions I have called attention to the capture of dragonflies by the insect traps set by *Drosera rotundifolia.* On June 22nd, at the Black Pond, near Esher, my attention was taken by a bed of this plant, which had secured quite a number of the smaller dragonflies. Those identified were one *Pyrrhosoma nymphula*, one *Agrion puella*, and a number of *Enallagma cyathigerum.* All were males.

On Sept. 11th, at the larger of the Penn Ponds, in Richmond Park, one or two females of the large brown dragonfly, *Æschna grandis*, were observed to be ovipositing in the shallow water close to the margin. This they did by settling either on a floating weed, or on one that stood but little out of the water, and then bending the abdomen so as to dip its extremity perpendicularly below the surface. The operation seemed to be performed deliberately, as if the eggs were being carefully placed, which they no doubt were, and which is suggested by the possession of an ovipositor by this dragonfly, and by the cylindrical form of its egg, fitting it for insertion within the substance of soft tissue.

Near Byfleet, on July 16th, I observed, over the Canal, a pair of Agrionine dragonflies united *per collum.* They settled on a weed, and shortly afterwards I noticed the female in the act of descending below the surface of the water. She went down one or two inches at least, and appeared to be ovipositing. To make quite sure of the species, I tried to catch the male, which was hovering over the spot. By so doing I frightened the female, and she came to the surface. The water did not seem to have wetted her body; in fact, when under the water, she appeared to glisten as if surrounded with a coating of air. After making the stroke, I found in the net a male *Enallagma cyathigerum*, and so conclude that that was the species. Needless to say, I was extremely pleased to observe this rather striking phenomenon. It has been more than once mentioned of the genus *Agrion*, and once at least of *Lestes;* but it is a proceeding one would so little expect that to have seen it is most satisfactory.

About a week later, at the Black Pond, two or three pairs of *Pyrrhosoma nymphula* caught my attention. They were flying united *per collum* along a narrow ditch draining into the pond. Presently one of these pairs went down to the water, and the female settled on a floating leaf of *Potamogeton*, whilst the male still held her, and remained with its body vertical and wings horizontal. The female then moved the anal extremity of her abdomen about over the leaf as if ovipositing. After two or three minutes they flew away. On the under side of the leaf were two roundish egg-like bodies; but the insect did not appear to touch the under side, nor did I expect an egg of *nymphula* to be of that shape. On opening the abdomen of a female I found a large number of cylindrical bodies with one end pointed and the other rounded, about 1 mm. in length and ·25 in greatest breadth. They were colourless and semi-transparent, the contents being granular, and no doubt were the eggs. On plucking the leaf I could not at first find the eggs that had been laid. On the next day, however, when it had withered, I closely examined the dry leaf, and found some little ridges, which contained a long cylindrical body resembling in size and appearance the bodies I had taken from the female. These, which it is reasonable to conclude were the eggs, were between the two cuticles of the leaf, and therefore within its substance, where no doubt they were out of the way of many enemies.

Again, about a fortnight later, in the New Forest, I noticed a pair of *Platycnemis pennipes* united *per coll.* resting on a yellow water-lily blossom. The female was again moving the anal extremity of her abdomen along the surface of the stem, and, I concluded, inserting eggs in it. After considerable difficulty I managed to secure the blossom. The stem was closely examined, both fresh and withered, but not an egg could be seen, though I think they must have been there. Supposing oviposition was taking place, it is worthy of note that the female was laying her eggs above the water, although when the blossom of the water-lily had withered the stem would be submerged again, for the fruit of the yellow water-lily comes down to the surface, even though the blossom may stand some inches out of the water.

On June 1st, at a few minutes to 1 p.m., I noticed that a

Libellula quadrimaculata had just begun to emerge, and I was able to watch almost the entire process. After about ten minutes the whole of the imago was out except two or three of the hind segments of the abdomen, and the head and thorax were thrown back as if the insect were helpless. For nearly an hour it "rested" in this apparently uncomfortable position, looking as if it might fall head foremost into the water at any moment. A *P. nymphula*, whose emergence was watched on April 27th, did not fall back in this way, and the "rest" only lasted about twelve minutes; while an *Agrion puella*, caught apparently in the "resting" position, was erect also. To return to *quadrimaculata*. The insect (a female), without any warning, suddenly swung itself forward, seized the nymph-case, and drew out the rest of its abdomen, and in the position assumed seemed to be clinging to its own dead body. About half-past two the wings were of full size, but opaque, while the body had increased in length but little, and it was still short when I was forced to leave. The wings were then adpressed to one another, as in the resting position of the Agrionidæ. In the evening they were spread out flat, as is usual with the Anisopterid dragonflies; the body was of full length, and the colours were well on their way. On the following evening the wings were still glossy, but otherwise the insect had practically assumed its mature colouring. Though the body sways from back to front, and gives occasional twitches while growth is taking place, I have never seen the expanding dragonfly walk forward up its support, as described by some authors, to assist in the process of expansion, which, however, is always a most interesting proceeding, and cannot but call to mind Tennyson's beautiful lines from the "Two Voices":—

"To-day I saw the dragonfly
Come from the wells where he did lie.

An inner impulse rent the veil
Of his old husk; from head to tail
Came out clear plates of sapphire mail.

He dried his wings; like gauze they grew;
Thro' crofts and pastures wet with dew
A living flash of light he flew."

SOME NEW GENERA AND SPECIES OF PHYTOPHAGOUS COLEOPTERA FROM INDIA AND CEYLON.

By Martin Jacoby.

Lema gahani, sp. nov.

Dark metallic blue; the antennæ, tibiæ, and tarsi black; thorax very minutely punctured on the disc; elytra scarcely depressed below the base, the anterior portion distinctly punctate-striate, the posterior half simply striate, the interstices convex near the apex. Length, 6 mill.

Of a uniform dark blue colour; the head impunctate, the neck scarcely constricted, with traces of fulvous colour; eyes very prominent, the lateral grooves very deep; clypeus impunctate, labrum and palpi nearly black; antennæ very short, black, the third joint one-half longer than the second, but shorter than the fourth, four lower joints shining, the rest pubescent and robust; thorax not much longer than broad, moderately constricted at the sides, the anterior angles rounded, the basal sulcus deep and sinuate, the disc extremely minutely and remotely punctured, rest of the surface impunctate; scutellum small, black; elytra parallel, with a very feeble depression near the suture below the base, regularly and rather strongly punctured at the anterior half, the punctures gradually diminishing in size and their places occupied by striæ at the posterior portion, the interstices convex at the latter place, impunctate; below dark blue, as well as the legs, sparingly clothed with grey pubescence; the posterior femora not extending beyond the second abdominal segment; ninth row of punctures at the elytra entire.

Hab. Khasia Hills.

The single specimen which Dr. Kraatz kindly sent me differs from any of its similarly coloured Eastern relations in the short antennæ, finely punctured disc of the thorax, and the sculpturing of the elytra, which are only partly punctate-striate.

Lema westwoodi, sp. nov.

Metallic dark blue; the abdomen flavous; antennæ and legs nearly black; thorax finely rugose-punctate near the base only; elytra with deep basal depression, finely punctate-striate, the punctures nearly obsolete near the apex, ninth row entire. Length, 5 mill.

Head not constricted posteriorly, the vertex finely punctured at the sides with a short longitudinal central groove; eyes large, subquadrately notched, the surrounding space rugose; labrum black; antennæ long and slender, black, the third and fourth joints equal; thorax subquadrate, not longer than broad, very moderately constricted at the sides, the latter nearly straight when viewed from above, widened towards the apex, the anterior angles very minutely tuberculiform, the surface obsoletely sulcate near the base, the latter finely rugosely punctured, the middle of the disc with a few fine punctures, which are also visible near the anterior angles; scutellum broader than long, smooth; elytra strongly foveolate near the suture below the base, the basal portions very feebly raised, the surface distinctly punctate-striate, the punctures larger within the depression, much finer and more elongate posteriorly, where the interstices are convex; below and the legs nearly black; the abdomen fulvous or flavous.

Hab. Ceylon.

I know of no species of *Lema* from the East in which the thorax is similarly sculptured, nor of any from other parts of the world; this character and the colour of the abdomen will easily distinguish the species. In the Oxford Museum collection and that of my own.

Pantocometis viridicollis, sp. nov.

Metallic dark green, finely pubescent; the labrum, basal joints of the antennæ, and the legs fulvous; head and thorax minutely punctured, finely pubescent; elytra strongly punctured, fulvous, a spot on the shoulder, another before the middle, and a transverse band below the latter, dark blue. Length, 6 mill.

♀. Head very finely longitudinally strigose at the vertex, metallic green, finely rugose and pubescent between the eyes; labrum fulvous; eyes reniform; antennæ extending to the base of the elytra, black, the lower four joints fulvous, second and third joints small, the third less rounded, the other joints strongly transversely serrate; thorax twice as broad as long, the sides straight anteriorly, strongly rounded at the base as well as the posterior angles, the surface obsoletely transversely depressed anteriorly and obliquely so near the posterior angles, very minutely punctured and finely pubescent, metallic green; scutellum raised, finely pubescent, its apex truncate; elytra strongly and closely punctured, fulvous, a round spot before the middle near the suture and two others more or less connected below the middle, dark blue; below dark bluish, closely covered with silvery pubescence; legs robust, fulvous, the first joint of the posterior tarsi scarcely as long as the following two joints together.

Fem. Larger, the elytra much more finely punctured, the spots larger, an extra one placed on the shoulders.

Hab. Khasia Hills.

The general appearance of this species is that of *Gynandrophthalma*, but, excepting that the pubescence of the entire upper surface in *Pantocometis* is here confined to the head and thorax only, I cannot find differences to justify a separation from the last-named genus; it is true that in *Pantocometis* the hairs are long and erect, while in the present species the pubescence is very fine and adpressed, but that distinction in itself is of no generic value; the elytra are distinctly lobed also below the shoulders. The female varies a good deal from the male in the much finer and more distant punctuation of the elytra, the extra spot on the shoulders, and the much larger size of the other elytral markings which form nearly a broad transverse band below the middle. I received the specimens from Dr. Kraatz.

Chrysolampra thoracica, sp. nov.

Piceous below; the antennæ and legs fulvous; the head, thorax, and elytra metallic green, the thorax very finely and closely punctured; elytra strongly punctate-striate, the interstices at the sides very strongly transversely rugose, anterior femora strongly dilated and toothed. Length, 6 mill.

Head very closely punctured, the vertex with a longitudinal groove; clypeus rugose-punctate, its anterior margin slightly concave; labrum fulvous; antennæ nearly extending to the apex of the elytra, fulvous, the third joint slightly longer than the fourth; thorax twice as broad as long, of even width, the sides rounded, the surface finely and very closely punctured, the punctures rather more crowded at the sides, but not larger; elytra slightly transversely depressed below the base, with closely approached rows of deep punctures, the interstices strongly transversely rugose at the sides, costate at the apex; legs fulvous.

Hab. Silhet, India.

A rather small-sized species, of which I possess a single male specimen; and distinguished from its allies in the finely, closely, and evenly punctured thorax, in connection with the fulvous legs.

Chrysolampra flavipes, sp. nov.

Dark æneous below, the breast metallic greenish; antennæ, labrum, and legs fulvous, above cupreous; thorax strongly and subremotely punctured; elytra subgeminate, punctate-striate near the suture, the sides strongly and closely punctate and semirugose.

Fem. Sides of the elytra strongly rugose, the punctures confluent. Length, 6–8 mill.

♂. Head finely and somewhat closely punctured, cupreous, the vertex with a central longitudinal groove; clypeus scarcely more strongly punctured, its anterior margin nearly straight; labrum fulvous; antennæ entirely fulvous (the last three joints wanting), basal joint strongly thickened, second very short, third and fourth equal, elongate, fifth joint longer; thorax twice as broad as long, the sides strongly rounded, the surface strongly but not very closely punctured, the punctures of equal size, nearly absent at the lateral and basal margins; elytra very feebly depressed below the base, punctured like the thorax near the suture, where the punctures are slightly arranged in irregular double rows, the sides more strongly punctured, and the interstices very strongly transversely rugose, those near the apex of the elytra not raised, and impressed with single rows of punctures; below piceous, the breast more or less metallic green; the legs pale fulvous, the anterior femora strongly dilated.

♀. Larger; the elytral interstices more strongly rugose, those at the apex longitudinally costate; the breast and abdomen obscure æneous.

Hab. Khasia Hills.

This is another species which does not agree with any of its congeners; the punctuation of the thorax is different, the sides of the latter might almost be called subangulate, and the legs are entirely fulvous. I received both sexes from Dr. Kraatz.

(To be continued.)

NOTES AND OBSERVATIONS.

Information and Material wanted.—Now that the first volume of my new work on 'British Lepidoptera' is completed, and entomologists have an idea of the scope of the work contemplated, I should be glad of help in every possible form with regard to the Plumes, the Psychids, the Lasiocampids, the Endromids, the Saturniids, and the Sphingids; notes on the egg (and egg-laying), larva (and habits of larva), pupa and cocoon; also actual dates of appearance, localities of capture, parasites, food-plants, variation, and other interesting details, would be exceedingly welcome. Probably some one lepidopterist knows some particular species better than anyone else. I am anxious to get such information as is available brought together, so that the entomologist has not to waste so much time as at present to discover what is known of each species. If the time spent on volume i. is to be a criterion to following volumes, their production will be a very slow matter, although already a fair amount of the available material relating to the families mentioned above is already in hand. I particularly want at present cases of Psychids for description, eggs relating to any of these groups, and newly hatched larvæ. I have done most of the pupæ and some eggs, but if entomologists will kindly keep my requirements in mind during the next three or four months I shall be very grateful, and a complete life-history of most of the species dealt with should be available, say in twelve months' time. I need not add that tabulated dates and localities are better for reference than those enclosed in letters on general subjects. In giving localities, please add counties. The schoolmaster is abroad, we know, but I have learnt more geography (relating to outlying districts in the British Islands) than I had previously considered possible, and have just begun to fathom my own ignorance in this direction.—J. W. Tutt; Westcombe Hill, S.E.

Pupation of Cossus ligniperda.—I can corroborate Dr. May's observation as to the pupation of *C. ligniperda* (*ante*, p. 17). The full-fed larvæ have frequently been dug up in my garden in the autumn, but always at a considerable distance from any tree or bush of any description. I have also constantly had them brought to me, and have also often seen them myself, when wandering about evidently searching for a suitable place in which to burrow. I have then placed them in a box half full of earth, in which they pass the winter, and do not spin their cocoons, which are composed of silk and earth, until the following April. The imagines emerge in June.—Edward Ransom; Sudbury, Suffolk.

Continental Locality for Lycæna arion. — With regard to the information required by Mr. Dallas (*ante*, p. 38), I may mention that I captured *Lycæna arion* in two localities in Switzerland last year. At Montana, above Sierre, it was just emerging between June 17th and 25th, and it was tolerably common at Zermatt from June 25th to July 4th. I believe that I also took it at Evolena from the 7th to the 13th of the latter month, but of this I cannot be sure, as some of my specimens were unfortunately destroyed.—(Rev.) William W. Flemyng; Coolfin, Portlaw, Co. Waterford, Feb. 11th, 1899.

Lycæna arion.—On reading Mr. Dallas's enquiry concerning the rearing of *L. arion* I remember that in August, 1897, I had noted a larva that I had found when searching among thyme for the larva of *Eupithecia constrictata* after sundown. The larva was probably full-fed, as on Aug. 18th it spun two strong silk threads, pulling the muslin together on the top of my rearing-cage, and proceeded to make a loose silk hybernaculum in which to pass the winter. This it accomplished, for in March, 1898, it was still alive. During April I was, unfortunately, unable to attend to it, and in May it was shrivelled up and dead. I think there can be little doubt that it was the larva of *L. arion*, and that therefore the spring months would be the best time to look for it, and that the help of a lantern might be called in if daywork was unsuccessful. The following are my notes on the larva:—Colour, pale apple-green, surface roughened, white-sprinkled, dorsal line faint, spiracles brownish; head bilobed, brown, mottled with darker; body attenuated at extremities, swollen in the middle, sparsely covered with short hairs. Length ¾ in. when extended.—E. B. Nevinson; 3, Tedworth Square, Chelsea, S.W.

Pupation of Smerinthus populi.—In a communication from my brother, Mr. H. L. Sich, dated Whitby, Aug. 11th, 1898, he describes the process by which a larva of *S. populi* assumed the pupa stage as follows:—

"Just watched a larva of *Smerinthus populi* change into a pupa. I noticed the skin of the larva around the claspers had previously become loose. The pupa then began to draw up its body within the larval skin until the latter split on the back of the third segment. This slit increased at both ends, and when it reached the first segment the head of the pupa was withrawn from the skin; this then slipped down the body, which wriggled out of it. The pupa at first was light green in colour. It was able to move the head both laterally and vertically. The antennæ and legs were very distinct. The terminal half of both organs were standing away from the body of the pupa. On the body, below the wing-cases, could be seen the grooves in which the margins of the wing-cases rest. Afterwards the body was drawn up to meet the wings, which then assumed the usual position. The pupa, which was then lying on its side, turned on its back and subsequently became quite normal."

This larva had duly gone down, but owing to my brother leaving Whitby it had to be taken from the earth before the pupa was formed. —Alfred Sich; "Brentwood," 65, Barrowgate Road, Chiswick.

Synonymical Note on Colias edusa and C. hyale.—Dr. Chr. Aurivillius (Entomol. Tidskrift, 1898, pp. 61–4) has recently discussed at some length the synonymy of two species of *Colias* usually known to British Lepidopterists as *hyale* and *edusa*. The conclusions arrived at are as follows:—

1. Colias hyale, Linn. 1758 & 1761; God. 1819; Boisd. 1836, etc.
    palæno, Esper, 1777; Hübn. 1798–1805.
    kirbyi, Lewis, 1872; Kirby, 1896.
2. Colias electo, Linn. 1763.
    electra, Linn. 1767.
    var. croceus, Fourcr. 1785.
        hyale, Esper, 1777; Hübn. 1798–1803.
        edusa, Fabr. 1787; God. 1819; Boisd. 1836, etc.

so that the species enumerated in the list of British butterflies (*ante*, p. 32) as *C. edusa* will apparently be known in future as *C. electo* var. *croceus*.—G. W. Kirkaldy.

CAPTURES AND FIELD REPORTS.

Pieris rapæ in January.—An example of *P. rapæ* (which has been examined by Mr. John Sandison) flew across a room in a house at Wimbledon on January 29th (a dull and rather cold day). It is presumed that it arrived concealed among some plants.—G. W. Kirkaldy.

Phlogophora meticulosa in Winter Months.—On February 7th a specimen of *Phlogophora meticulosa* was taken in a greenhouse at Cobham. It was in such fine condition that it could have but just emerged.—N. O. Gurney; Broad Street, Teddington, Feb. 10th, 1899.

[A Liverpool correspondent informs us that he took an example of this species from off a garden wall on December 21st last. When first observed the wings were not quite expanded; but when fully developed the insect proved to be unusually dark in colour.—Ed.]

Note on Ephestia kühniella.—Larvæ of *E. kühniella*, in various stages of growth, were found this month infesting a packet of Florida food and another of Quaker oats, which had been laid aside for some time. The larva is smooth and of a reddish tint, and spins a white web amongst the food. I noticed occasional specimens of the moth about the house during last summer and autumn; and a specimen was flying here on February 8th. On referring to former volumes of the 'Entomologist,' I learn that this insect has been imported with rice or flour; that it was first noticed in this country in 1887, and appears to be spreading.—W. Paskell; 96, Studley Road, Forest Gate, E.

Notes from North Wales.—Seeing a list of Lepidoptera taken by Mr. Barraud at Aber in August (*ante*, p. 20), I thought it might not be altogether out of place to send a list of my own captures at a place not far distant, Colwyn Bay. The time was between May and July, including the last two weeks of the former and first three of the latter. Of the butterflies I noted the following:—*Pieris brassicæ*, not at all common. *P. rapæ* and *P. napi*, both fairly plentiful. *Euchloë cardamines*, plentiful in the Nant-y-glyn valley, which is situated at the east end of the town, and runs in an almost due south direction. *Argynnis selene* and *E. euphrosyne* were both found in the same valley as *E. cardamines*, but the latter is much more plentiful than the former. *Vanessa urticæ* is found almost everywhere; and I took the larvæ of *V. io* in large quantities in 1897. *V. atalanta* and *V. cardui* were also met with, but were not common. *Pararge egeria* and *P. megæra* were both common. *Satyrus semele* was exceedingly plentiful on the western side of Bryn Eurian, a small hill situated to the west of Colwyn Bay, between the Conway and Llandudno roads. *Epinephele ianira* swarmed in almost every field; while *E. tithonus* was found in the fields to the west of Bryn Eurian and east of Pabo. *Polyommatus phlæas*, *Lycæna icarus*, and *Nisoniades tages* were all common. I also took a few *L. minima;* while a friend of mine showed me a specimen of *Hesperia sylvanus*, but this is the only specimen ever taken or seen in the neighbourhood, as far as I can ascertain. The "hair-streaks" seem to be wanting in this locality. Of the moths I obtained about fifty species, the best of these being *Macroglossa stellatarum*, not very common; *Nemeophila plantaginis; Cossus ligniperda*, one female specimen; *Geometra papilionaria* and *G. vernaria; A. sylvata* and *Ennychia octomacualis*, the latter on the side of Moel Shiabod, near Dolwyddelan.—Oscar Whittaker; Morelands, Heaton, near Bolton.

Notes from the South-west of England in August, 1898.—While at Lyme Regis in Dorset, early in August last, I saw three specimens of *Colias edusa* on the cliffs between that place and Seaton. One of the three, a fresh male, I captured on August 11th. In the evenings *Miana bicoloria* was very abundant on the waste ground above the beach just outside Lyme. In the middle of the month I found a dense colony of *Lycæna corydon* along the banks of the main road between Salisbury and Wincanton just on the edge of the plain. A few perfectly fresh *Vanessa cardui* also occurred in the same place. I saw *Colias edusa* again, about August 20th, in a clover field near Taunton. *Gonopteryx rhamni* was very abundant in the same neighbourhood. During the last fortnight of the month we found the electric light at Taunton very attractive to moths. Most of them were of the commoner Noctuæ, *Plusia gamma* swarming on some nights; but among better moths we took *Dicranura furcula*, *Notodonta dictæa* (common), *Acronycta rumicis*, *Agrotis puta*, *Noctua c-nigrum*, *Eugonia alniaria*, and *E. fuscantaria*.—Alfred S. Tetley; Newtown, N. Wales.

Information Wanted.—I am anxious to devote next summer to making as good a collection of English and European butterflies as can be managed, personally, in the time. I should be very grateful if any reader of the 'Entomologist' could tell me the most likely places to go to, and the most favourable dates.—C. B. Wilkieson; Queen Anne's Mansions, Westminster, S.W., Feb. 17th, 1899.

Lepidoptera in the Halifax District.—Mr. Edward Halliday, in a note to the 'Halifax Naturalist' (February, 1899), states that the past year was a bad one for Lepidoptera in his district. He writes:—"All the butterflies, except the common whites, have been rare. On the moors the emperor moth was less plentiful than usual; and other local moths, such as *Celæna haworthii* and *Scodiona belgiaria* have been more scarce than I have ever known them. . . . . I met with very few *Dasypolia templi* in October this year."

SOCIETIES.

Entomological Society of London.—*January* 18*th*, 1899.—*Sixty-sixth Annual Meeting*.—Mr. Roland Trimen, F.R.S., President, in the chair. The balance-sheet of the Society's accounts, showing a large balance in favour of the Society as against a nominal one in January, 1898, was read by Mr. A. H. Jones, one of the auditors. The Report of the Council was next read, from which it appeared that during 1898 the Society had lost three Fellows by death and eight by resignation, while three honorary Fellows and thirty four ordinary Fellows had been elected. This was the largest addition to the Society's ranks in any year, except 1886, when the circumstances were exceptional. The number of Fellows now stood at 424, of whom twelve were honorary. The 'Transactions' for the year formed a volume of 444 pages, and comprised twenty-two papers, contributed by nineteen authors, and illustrated by nineteen plates. The library had been largely augmented during the year by the bequest of the late Mrs. H. T. Stainton of such books in her husband's large entomological library as were not previously in the Society's possession. It was announced that the following gentlemen were elected as Officers and Council for 1899:—President, Mr. G. H. Verrall; Treasurer, Mr. R. McLachlan, F.R.S.; Secretaries, Mr. J. J. Walker and Mr. C. J. Gahan; Librarian, Mr. G. C. Champion; and as other Members of Council, Mr. W. F. H. Blandford, Dr. T. A. Chapman, Mr. H. St. J. K. Donisthorpe, the Rev. Canon W. W. Fowler, Mr. A. H. Jones, Mr. F. Merrifield, Mr. E. Saunders, Mr. R. Trimen, F.R.S., Mr. J. W. Tutt, and Mr. C. O. Waterhouse. The Address of the retiring President was then read by the Secretary. In this, after a review of the present position of the Society, an account was given of the various experimental researches and observations made on the subject of seasonal dimorphism in Lepidoptera from those of Weismann down to the evidence recently brought forward by Dr. Dixey on the existence of this phenomenon in Neotropical Pierinæ. The Address concluded by the repetition of the recommendation made on the previous occasion—that biological stations should be established in tropical countries for the study of seasonal dimorphism, mimicry, and kindred phenomena. The proceedings terminated with the passing and acknowledgment of votes of thanks to the retiring President and the Officers.

February 1*st*.—Mr. George H. Verrall, President, in the chair. The President briefly returned thanks for the honour conferred upon him by his election, and announced that he had nominated the Rev. Canon Fowler, M.A., F.L.S., Mr. Edward Saunders, F.L.S., and Mr. Roland Trimen, F.R.S., as Vice-Presidents for the session. Mr. Henry William Andrews, of 9, Victoria Road, Eltham, was elected a Fellow of the Society. Mr. Champion exhibited three specimens of an interesting species of Fulgoridæ, *Atalanta auricoma*, Burm., recently received from British Honduras, from M. Blancaneaux; and stated that he had found lepidopterous larvæ in the white waxy matter attached to the body of an allied species, *Enchophora stellifer*, Burm., in Central America, of which insect he exhibited a specimen, together with a larva taken from it. This larva was very like that of *Epipyrops anomala*, Westw., a species of Arctiidæ which is attached to *Fulgora candelaria* in a similar way. He also showed numerous specimens of both sexes of an undescribed species of *Apiomerus* (family Reduviidæ) found by himself in Chiriqui, and pointed out some of the more interesting peculiarities of each sex. Mr. Tutt exhibited, on behalf of the Rev. G. H. Raynor, a large series of *Spilosoma lubricipeda*, Linn., inbred from specimens originally captured in Lincolnshire. Its chief interest seemed to be its demonstration of the fact that the extreme aberrations of this species could be produced by inbreeding from comparatively normal forms, a fact of all the more importance considering how much uncertainty there had been as to the real origin of the race which was first sent out from Yorkshire, and is now to be seen in many collections of British insects. He also exhibited, for Mr. Raynor, an aberration of *Epinephele tithonus*, taken at Hazeleigh in August, 1892, in which the bright fulvous areas were pale yellow in colour; and a somewhat strange aberration of *Noctua rubi* which showed considerable difference from the normal form in the arrangement of the transverse lines of the fore wings. Mr. Tutt then exhibited a number of closely-allied forms of *Anthrocera*, recently received from M. Oberthür of

Rennes, and comprising among others the following:—*A. medicaginis*, Dup., *A. medicaginis*, Bdv., *A. charon*, Dup., and *A. charon*, Bdv. The first two of these, as probably also the fourth, Mr. Tutt referred to *medicaginis*, Bdv. (Mon. des Zyg.), considering them to be possibly forms of *Anthrocera loniceræ;* while the specimens of *A. charon*, Dup., taken at La Roche in August, 1896, were, he stated, almost indistinguishable from typical *loniceræ*. Having shown also some examples of *A. seriziati* from Collo, and one, with very dark hind wings, from Bona, he said he had no hesitation in referring these to *Anthrocera palustris* as an extreme southern form. Mr. Tutt next exhibited specimens of *Anthrocera filipendula*, captured by Mr. W. H. Harwood near Colchester, which showed remarkable colour-aberrations extending from terra-cotta red to orange, as described at length in the account which he had recently given of the genus. He remarked on the peculiarity of these specimens, insomuch that they appeared more closely to resemble Lederer's well-known Asiatic races of the species than any other yet described. Mr. A. H. Jones exhibited a fine specimen of *Sphæria robertsi*, one of the pyrenomycetous fungi, attached to the larva of *Charagia virescens?* Mr. Percy T. Lathy communicated "A Monograph of the genus *Calisto*"; and the Rev. F. D. Morice, papers entitled "Illustrations of specific characters in the armature and ultimate ventral segments of *Andrena* ♂," and "Notes on *Andrena taraxaci*, Giraud."—J. J. Walker and C. J. Gahan, *Hon. Secs.*

RECENT LITERATURE.

1. *Biology of the Coprophagous and Necrophagous Diptera.* 2. *Studies upon Lucilia bufonivora*, Moniez, *parasite on anurous batrachia.* (In Russian.) "Trud 'i russk. éntom. Petersburg," 1898, vol. xxxii. pp. 225–79; 9 figs. By J. Portschinsky.

It has been known for some time past that the larvæ of a dipteron (*Lucilia silvarum*, Meig.) are occasionally found in the nostrils and eye-cavities of toads (*Bufo*), when the fleshy parts of the head are more or less eaten away. The presence of these larvæ is merely accidental, the ova being deposited only when the batrachians suffer from open wounds. After referring to this, and giving an historical account (of 7 pp.), the author proceeds to recount a similar case in which two species of *Rana* were attacked so determinedly by another parasitic dipteron that these frogs became almost extinct near Petersburg. In this latter case the larvæ were the cause and not the concomitant of the mortality, and the "disease" was apparent in many cases by the presence of deformities, such as a large bump on the top of the head, caused by the masses of larvæ beneath. This fly is *L. bufonivora*, Moniez, and, although practically indistinguishable from *L. sylvarum* in the imaginal state, differs widely from it in the egg and larval stages. *L. bufonivora* is double-brooded, and each female deposits about sixty to eighty ova in rows on the backs of the frogs; the majority of these are broken or rubbed off, but the few that hatch (in about a day and a half) locate themselves in the eye-cavities and nostrils and start at once eating away the fleshy parts circumjacent. The frogs die in about three days. G. W. K.

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THE GENUS *CIGARITIS* AND ITS APPLICATION.

By A. G. Butler, Ph.D.

The name *Cigaritis*, as M. Donzel noted in 1847, was originally proposed by Boisduval for certain undescribed African Lycænidæ, but, until M. Donzel's description of *C. zohra* was published, it remained a mere manuscript name; nor did M. Donzel give any characters to the genus, or indicate in any way which of the African species was supposed to be the type of the undescribed genus.

In 1849 M. Lucas described two species, *C. masinissa* and *C. siphax*, figuring the latter as "*Zerythis syphax*" (sic); but still giving no characters for the genus.

In 1850 M. Lucas described *Cigaritis*, and gave a figure of *C. masinissa*. The genus having now received characters for the first time, and *C. masinissa* being the only species noted, this, as Dr. Staudinger most reasonably decides, becomes the type.

In his 'History of the Genera of Butterflies,' Dr. Scudder seems utterly to ignore the importance of a description for a genus, and actually credits Boisduval with the authorship of *Cigaritis*, and Donzel with the authorship of its type, which he declares judicially to be *C. zohra*; whereas there is nothing whatever to show that the *Cigaritis* of Boisduval manuscript was not intended for some African *Zeritis* or *Chrysophanus*; and, in common sense, one must conclude that until a genus is described it has no legal existence.

The species now placed by Dr. Staudinger under *Cigaritis* represent merely two sections of the genus *Spindasis*. If *Cigaritis* be retained at all, it can only be used for *C. siphax*, *C. masinissa*, *C. zohra*, and *C. cilissa*, in which the secondaries are more rounded than in the typical forms of *Spindasis*, to which *C. acamas* and all the well-known types belong.

Of African species which have been referred erroneously to *Cigaritis*, *C. leroma* falls into Wallengren's genus *Crudaria*, which chiefly differs from typical *Chrysophanus* in the tailed secondaries; whereas *C. zeuxo* and *C. abbottii* appear to differ in no respect from *Chrysophanus*.

Zeritis lycegenes, *Z. lyncurium*, and *Z. pyroeis* of Trimen (which have been placed in *Cigaritis* in collections) differ in structure, and may be placed in—

PŒCILMITIS, gen. nov.

Allied to *Chrysophanus*, but differing in having five (instead of four) branches to the subcostal vein of primaries. Type, *Z. lycegenes*.

I have not examined *P. lyncurium*, but, judging by the figures, it must be nearly related to *P. lycegenes*.

TWO NEW RHYNCHOTA (REDUVIIDÆ AND CORIXIDÆ) FROM JAPAN, AND DIVERSE NOTES.

By G. W. Kirkaldy.

1. *Ischnonyctes prædicator*, sp. nov.

♂. Lobes of head subequal in length, apical margin of posterior lobe emarginate; rostrum reaching beyond apical margin of prosternum, first segment nearly one-half longer than second, third slightly longer than first. Pronotum at the base with a very distinct collar (sinuately margined anteriorly); meso- and metathorax fused, a pronounced carina between the intermediate coxæ, and another between the posterior coxæ. Anterior femur with a very long (one-tenth of the length of the femur) spine, not quite one-half of the entire length of the femur from its base, and a double row of medium-sized spines and of small spinelets, extending from the longest spine to the apex. The long spine is directed distinctly anteriorly, the others are nearly perpendicular. Anterior tibia reaching (when folded) to three-tenths of the length of the femur from its apex, tarsus reaching not quite so far as the long spine. Tibia dilated towards the apex (which is provided with a short tuft of hair) and armed beneath, along its entire length, with short subequal spinelets. Intermediate and posterior femora and tibiæ somewhat obsoletely spined, the tibiæ slightly curved outwards; claws, two on each tarsus, anterior very minute, others longer, falcate. Elytra rudimentary, not reaching to base of metanotum. Dorsal sutures of first five abdominal segments very obsoletely indicated.

Proportionate measurements.—Head 30 (15 + 15); pronotum 45 (40 + 5), meso- and metathorax 65; abdomen 230. Antennæ 125 :

85 : 12 (?) : 40 (?). Anterior coxa 60, femur 100, tibia 35, tarsus (apparently unisegmentate) 20; interm. femur 146, tib. 175, tarsus 11 (10 : 6 : 9), claws 2. Posterior femur 195, tib. 235, tarsus 12 (5 : 3 : 4), claws 2. Total: anterior leg 215; interm. leg 345; post. leg 455. Length 17 mill.; width at int. coxæ 0·8 mill.

Japan. Niigata: Sept. 14th, 1881. Mr. Distant's coll.

Pale luteous, with a broad blackish lateral band on head and thorax. Head with two submedian brownish-black bands; thorax with a slender crimson median line; abdomen with one median and one lateral crimson line, obsolete in places. Sterna stramineous, with a broad median and a rather irregular lateral black band, somewhat obsolete on the prosternum. Anterior legs sordid flavous, irregularly infuscate; spines whitish, black-tipped; spinelets blackish. Intermediate and posterior legs fusco-flavous, apical half of femora and basal half of tibiæ annulated with brownish-black or brownish-yellow, tarsi blackish. Abdomen rufo-fuscous, mottled with brown and stramineous.

I have placed this fine species in *Ischnonyctes*, Stål (a genus hitherto known only from Algeria and Corsica—two species being enumerated in Lethierry and Severin's 'Catalogue,' iii. p. 75, although Puton considers them (1880 and 1886) to be probably the same), as it agrees quite well with Stål's brief description (1874, 'Svensk Vetensk. Ak. Handl.,' 12, no. 1, pp. 94 & 96), except that the surface of *I. prædicator* appears to me distinctly, though very minutely, granulate.

2. *Gerris lacustris* (Linn.), Stål.

There is a specimen in Mr. Distant's collection, from Japan, which appears to me to be indistinguishable from ordinary British and French examples of the above species.

3. *Notonecta montandoni*, Kirk.

Burma, Ruby Mines (collections Distant and Kirkaldy).

4. *Corixa distanti*, sp. n.

Belonging to subgenus *Basileocorixa*, Kirk., to the group of *striata* (Linn.).

Elongate; pronotum and elytra (membrane excepted) somewhat strongly rastrate. Macropterous. Lateral and posterior angles of pronotum rounded. Metaxyphus long, isosceles-triangular, reaching to about two-thirds of the length of the posterior coxæ, rounded basally. Intermediate femur more than twice as long as the tibia, which is one-third longer than the tarsus, claws one-sixth longer than the tarsus. ♀. Palæ cultrate. Length 11 mill.; width 3·7 mill.

Japan. Hako (coll. Distant).

Pronotum dark brown (lateral margins flavous), with about nine yellow lines, fairly entire (middle lines split). Elytral designs very clear, yellow lines of the corium not divided into series by brown longitudinal lines. Yellow lines of clavus and those at the base of the corium fairly parallel; those of the membrane and towards the apex of the corium abbreviated, interrupted, undulated. Head, legs, &c., pale yellowish; mesosternum (margins excepted), metanotum, base and middle of dorsal aspect of abdomen blackish.

I have great pleasure in dedicating this fine species (readily separable by its size from the other *Basileocorixæ*) to my friend Mr. Distant, whose name is so happily associated with the Rhynchota of the Japanese subregion.

5. *Corixa mercenaria*, Say.

Bolivia (collections Distant and Kirkaldy). Imported as bird food. Now known to me from California, New Mexico, Texas, Mexico, and Bolivia.

SOME NEW GENERA AND SPECIES OF PHYTOPHAGOUS COLEOPTERA FROM INDIA AND CEYLON.

By Martin Jacoby.

(Concluded from p. 70.)

Rhyparida khasianensis, sp. nov.

Fulvous; terminal joints of the antennæ black; thorax transverse, very sparingly punctured; elytra strongly punctate-striate, the interstices impunctate; femora unarmed; tarsi piceous. Length, 6 mill.

Head impunctate; the clypeus very broad, subquadrate, distinctly separated from the face, impunctate, its anterior margin semicircularly emarginate; antennæ very long, nearly extending to the apex of the elytra, flavous, the last seven joints black, second joint very short, the third nearly three times as long, the following joints nearly of similar length; thorax transverse, more than twice as broad as long, but little widened at the middle, the sides nearly straight, the anterior angles slightly tuberculiform, the surface very sparingly and finely punctured, fulvous; scutellum broad, impunctate; elytra wider at the base than the thorax, not depressed below the base, the shoulders prominent, the surface rather strongly punctate-striate, the punctures closely placed, the interspaces slightly convex, impunctate; below and the legs fulvous; tarsi more or less darkened; prosternum broad,

Hab. Khasia Hills, India.

Very few true species of *Rhyparida* from India have been described; the present one, although agreeing in every other respect with the genus, differs somewhat in the short second joint of the antennæ, which in most other species of the genus is distinctly longer. I received a single specimen from Dr. Kraatz.

Corynodes pretiosus, Baly.

Metallic blue or purplish; the head and disc of the thorax cupreous; elytra closely punctate-striate, reddish cupreous, a broad transverse band at the middle, another near the apex, and the suture narrowly purplish, margined with green. Length, 9–10 mill.

Head cupreous, remotely punctured, the vertex with a deep central groove; the spaces surrounding the eyes and the clypeus metallic blue or green, the latter closely punctured; labrum and mandibles black; antennæ dark purplish, the last five joints gradually and broadly dilated; thorax about one-half broader than long, slightly narrowed in front, the anterior angles produced, the surface convex, strongly and remotely punctured, the sides and the base nearly impunctate, the latter portion metallic green, the anterior part cupreous, or the entire surface of the former colour; scutellum purplish, impunctate; elytra not depressed below the base, rather strongly and closely punctate-striate, reddish cupreous, with a transverse purplish band at the middle, which narrows greatly towards the suture without extending to the latter; another similarly coloured band of curved shape extends across the suture near the apex, but not to the lateral margins, the suture itself also narrowly purplish and margined like the bands with metallic green; below and the legs varied with purplish or green; claws appendiculate.

Hab. Burmah and India.

I have given here a more detailed and correct description of this handsome species than Baly has done, who described the head and legs as black, which certainly is not the case in the type contained in the British Museum. Two other specimens I received from Herr Bang-Haas.

Chrysomela gahani, sp. nov.

Very convex, black; head and thorax impunctate, sides of the latter with a deep longitudinal sulcus; elytra dark fulvous, entirely impunctate. Length, 9 mill.

Head subquadrate, black, shining, impunctate; clypeus distinctly separated from the face; antennæ slender, black, the terminal joints elongate, gradually thickened; thorax more than twice as broad as long, the sides straight, the anterior angles produced but blunt, the anterior margin straight at the middle, the disc entirely impunctate, the sides thickened, bounded within by a deep sinuate longitudinal groove; scutellum broader than long, blackish; elytra very strongly convex at the middle, dark fulvous, impunctate; under side and legs black, shining, impunctate; prosternum narrowly elongate.

Hab. Ceylon.

This species, of which I possess a single example, will not be difficult to recognise on account of the entirely impunctate upper and under surface, a rare instance in species of this genus.

Haltica semipiceus, sp. nov.

Below and the legs piceous; above dark blue; basal joints of the antennæ flavous; thorax very finely punctured, the sulcus obsolete; elytra very closely and distinctly punctured. Length, 3 mill.

Head impunctate at the vertex, the frontal elevations narrowly transverse, interrupted at the middle by another transverse groove;

the clypeus strongly raised, deflexed anteriorly, more or less flavous, as well as the labrum and the palpi; antennæ extending beyond the middle of the elytra, black, the lower four or five joints more or less flavous, third and fourth joints equal, both not much longer than the second joint, the latter thickened; thorax about one-half broader than long, slightly narrowed anteriorly, the sides straight, the anterior angles produced, the surface finely and somewhat closely punctured, the basal transverse sulcus obsolete; elytra much more distinctly and rather closely punctured, the interstices very slightly wrinkled here and there; below and the legs piceous, sparingly pubescent, the posterior femora strongly incrassate, the spine at the apex of the posterior tibiæ large.

Hab. Khasia Hills.

One of the smallest species of the genus, which may be known from other Eastern forms in the piceous, not blue, under surface and legs, the flavous basal joints of the antennæ, and the obsolete transverse sulcus of the thorax. I have received several specimens from Dr. Kraatz.

Podagrica ceylonensis, sp. nov.

Pale flavous or testaceous; thorax with a few minute punctures, the base with a perpendicular groove at the sides; elytra finely punctate-striate. Length, 2 mill.

Head entirely impunctate, obliquely grooved above the eyes, frontal tubercles obsolete; clypeus triangular; palpi slender; antennæ flavous, extending to the middle of the elytra, the third and fourth joints equal, the following scarcely longer, the terminal joint thickened and elongate; thorax twice as broad as long, the sides rounded before the middle, constricted at the apex, anterior angles slightly oblique, posterior ones acute, the disc convex, with a few very minute punctures, the basal margin with a well-marked longitudinal groove at each side, the base narrowly marginate; elytra slightly widened at the middle, wider at the base than the thorax, regularly and finely punctate-striate, the interstices very slightly convex; under side and legs flavous; prosternum narrow and elongate.

Hab. Ceylon.

A very small species of uniform coloration, and probably identical with one of Motschulsky's unrecognisable Ceylon insects, of which I hope the above description will give a better idea. The species might perhaps equally well be placed in *Nisotra*. In the collection of the Oxford Museum and my own.

Haplosoma sexmaculata, sp. nov.

Pale fulvous; the antennæ (the basal joints excepted), the breast and abdomen, and the tarsi piceous: thorax sulcate, impunctate; elytra finely rugose-punctate, flavous, a spot near the middle and two others near the apex of each, black. Length, 8 mill.

Narrow and elongate, the head impunctate, frontal elevations strongly raised, trigonate; clypeus triangular; antennæ nearly extending to the apex of the elytra, black, the basal three joints flavous, fourth joint nearly twice as long as the third, the latter double the length of the second; thorax subquadrate, one-half broader than long, the sides straight, the angles thickened, the disc transversely depressed in shape of three nearly united broad foveæ, a small one also placed at the middle of the base, the surface entirely impunctate; scutellum piceous; elytra finely rugose, flavous, with a small black spot placed immediately before the middle, and two other larger ones placed transversely near the apex; elytral epipleuræ comparatively broad at the base, much narrowed posteriorly; breast and abdomen piceous, the segments of the latter margined with fulvous; legs flavous, the apex of the posterior femora and all the tarsi piceous; claws bifid.

Hab. Khasia Hills.

The single female specimen kindly sent by Dr. Kraatz differs from any of its allies in the design of the elytra, and the broader epipleuræ of the latter.

KHASIA, gen. nov.

Body elongate, widened posteriorly; antennæ slender, longer than the body; palpi robust; head very broad; thorax subquadrate, strongly constricted at the base, the surface deeply bifoveolate; scutellum large, broader than long; elytra glabrous, impunctate, widened posteriorly, without any epipleuræ; legs very elongate and slender, the tibiæ with a small spine, the first joint of the posterior tarsi as long as the following three joints together; claws appendiculate; prosternum extremely narrow, the anterior coxal cavities open.

This is one of the most peculiar looking Galerucide on account of the long filiform antennæ and legs, and the quite unusual shape of the thorax, as well as the absence of any elytral epipleuræ; the genus will perhaps best find its place in Chapuis's 18th group, the Rupilinæ, near *Ellopia* and *Arima;* the female differs from the male in the greatly dilated abdomen, similar to that of several of the genera in the group where I have placed it.

Khasia kraatzi, sp. nov.

Head and abdomen black; antennæ (their apical joints excepted), the thorax, and legs more or less fulvous; elytra black, shining, impunctate, the basal portion deeply depressed. Length, 4–5 mill.

Head broad, the vertex swollen, impunctate, black, the frontal elevations narrowly oblique; eyes very prominent; palpi strongly incrassate; antennæ much longer than the body, flavous, the terminal three joints black, basal joint thickened, stained with piceous above, second very short, third joint twice as long, the fourth and following joints more elongate; thorax scarcely broader than long, the sides straight, strongly constricted at the base, the basal margin concave, slightly thickened, anterior angles thickened, the surface entirely impunctate, dark fulvous, very shining, with two deep oblique depressions near the base, interrupted by a narrow central ridge;

scutellum large, transverse, convex; elytra widened towards the apex, black, shining, impunctate, the basal portion deeply concave, raised near the suture, the sides costate from the shoulders to the apex; legs very elongate and slender, flavous.

Hab. Khasia Hills.

THE NEW WORK ON BRITISH LEPIDOPTERA.

By F. Merrifield, F.E.S.

I had proposed to offer you a rather full notice of the recently published first volume of Mr. Tutt's 'Natural History of the British Lepidoptera,'* which, in comprehensiveness and fulness of detail on all points of interest to the biologist, the systematist, and the collector, is, as regards the particular subjects treated, without a rival. My friend Dr. Chapman, however, who is infinitely better qualified than I am, has forestalled me, leaving a few points to which it may not be out of place to call attention. Among these is the fulness with which Mr. Tutt treats of the egg stage, which is greatly relied on by the author as a leading element in classification, and the information collected by him on which, much of it the result of original enquiry, is extremely valuable.

Mr. Tutt appears, in preparing this volume, to have fully availed himself of the vast and varied information which recent researches have supplied, in the shape of the treatises, transactions of learned societies, and magazine articles published in this and other countries. The whole subject is treated with wideness and appreciativeness of view, and the authorities from whom Mr. Tutt differs, as he often does, but perhaps not more than they differ among themselves, must feel that he is not without good reason for his opinions. It would be giving a wrong impression if this remark led to the inference that the controversial element is a prominent one in this work. Quite the reverse. One of the chief merits of the book is the fulness with which it sets forth the views of other authorities, and the reasons for the choice which it is necessary to make between them and the views, in many cases original, of the author.

In the general introductory part, occupying 112 pages, there is one subject that will be missed; there is no chapter on the pupa, that marvellous stage, it may be of only four or five days' duration, during which the creeping larva—the highly specialised product of millions of generations—seems to be almost resolved into primal elements and reorganised into the form of the imago, the active and beautiful winged creature, endowed with senses beyond human ken, that fills the summer air with brilliancy of colour and grace of movement. Mr. Tutt is doubtless fully sensible of the importance and interest that belong to this pupal stage, and one can only suppose that in the next volume he will devote a chapter to it; but the reader would have liked to have been told so.

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* Published by Swan Sonnenschein & Co., London; Friedländer & Sohn Berlin.

There is the usual element of confusion arising out of the frequent changes of names in recent years, but that is no fault of the author, who only observes the "law of priority" which seems to have been imposed on systematists, untempered by a "statute of limitations" such as the common sense and experience of mankind have imposed on laws of wider application. As one who necessarily learned the entomological language of an earlier epoch, it is quite a pleasure to the writer to meet with an old friend respectable enough to have only one alias, *Anthrocera filipendulæ*, and this species is treated in a most exhaustive way, twenty-six closely printed pages being devoted to it and its various stages, variations, and habits, &c. The other species, about one hundred in number, described in the volume are treated with similar copiousness.

I do not find that in all cases the author gives the wing expansion, and venture to think that this is a particular which should always be stated. Surely size is a material element in description?

What has been stated of the treatment of *A. filipendulæ* will serve to show the completeness with which the subjects are worked out. The author probably had his reasons, but one is inclined to doubt whether there is not too much particularity and minuteness; not that abundance of material is ever to be regretted by those who wish to know, but that it is natural to desire that the work be completed, and to doubt whether it would be practicable to carry the rest of the work through on the same scale. The price is moderate for the amount of matter, and no doubt the separate volumes will be complete and valuable in themselves; but the finished work on this scale would be of such a voluminous character that one fears it would be beyond the reach of many in whose hands one would like to see it. However, if the experience gained with this volume shows that condensation is desirable, it can be practised in the volumes that will succeed. And there are so many public libraries, institutions, &c., in England, in America, on the European continent, and even elsewhere, to which the possession of this work will be absolutely indispensable, that it may be hoped that the demand will justify the great expenditure of labour and time that has been made upon it. It should be in every reference library in the provinces professing to be of a comprehensive character.

A FORTNIGHT IN THE HIGHLANDS.

By G. T. Porritt, F.L.S., F.E.S., &c.

A long-hoped-for collecting expedition to that classic ground to entomologists—Rannoch—was realized in June last. Some time previously Mr. C. A. Briggs of Lynmouth, Mr. J. J. F. X. King of Glasgow, and myself had arranged to visit the locality, the chief inducement being that we might capture our own series of the two local and up to that time rare dragonflies, *Æschna borealis*, Zett. (*cærulea*, Ström.), and *Cordulia arctica*, Zett. Monday, June 6th, therefore saw me on my way to Glasgow, where, at the railway station, Mr. King met me; and during the evening I had the rich treat of looking over his collections of Neuroptera and Trichoptera. Next morning we were up betimes to take the early West Highland train to Rannoch, and soon had the satisfaction of being joined by Mr. Briggs, who had been travelling all night in order to meet us. A journey through lovely Highland lake scenery brought us in due time to Rannoch, from which place we had a ten miles' drive before us to Camghouran, a small hamlet close to the famous Black Wood, on the south side of Loch Rannoch, and almost midway between the two ends of the lake, the distance indeed being about ten miles from Loch Rannoch at the west end, and eight miles from Kinloch Rannoch at the east end. At Camghouran Mr. King had already engaged for us comfortable "quarters" at the farm-house of Mrs. Cameron, and there we spent nearly a fortnight in the wildest and most romantic spot it was ever my lot to be located in. Some collecting was done on the loch-side on the day of our arrival, but next morning we "set-to" in earnest to try to find the grand *Æschna borealis*. Not a trace of it could we then discover, and as we knew we were on the right ground, we were forced to the conclusion that it was not yet out. This proved to be the explanation, and nearly a week elapsed before we were absolutely certain we had even seen it. One morning, however, Mr. Kenneth J. Morton, of Edinburgh, who had joined us for a few days, called out that one had passed him, and a few seconds later Mr. King had it in his net. From that time the species emerged rapidly, due no doubt to the much hotter weather, and by the middle of our second week had become fairly abundant. But, like most species of the genus *Æschna*, *borealis* was most wary, and excessively difficult to catch. It does not, like *Æschna grandis* and *Æ. cyanea*, hawk for its prey in a forward and backward movement over the same ground, and so, unlike them, cannot be "waited for" until it comes within reach of the net. It flies at a terrific rate, but fortunately has a habit of settling on the ground, on tree-trunks, and perhaps oftenest of all on the dead trunks of felled trees. In such a situation we often saw two, and now and then even three close together, but very fortunate indeed were we if we managed to secure one out of the lot! Up to the time of my leaving, on June 20th, about sixty had been secured among us—many more, no doubt, than had hitherto been taken in Britain altogether; but still we must have *seen* at least two hundred more specimens than we captured. We could not at all satisfy ourselves as to where the species bred; they occurred all over the Black Wood and the immediate district, and seemed indeed equally plentiful on the high moorland above the wood, and in the lowest parts of the wood, sometimes even getting into the main road at the bottom. We never saw one actually on the loch-side, nor did they seem at all to frequent the lochan Rusg-a-Bhiora, above the Black Wood; hence they apparently did not breed in the "big" waters. They were, too, equally absent from the small almost stagnant ponds so frequent in and near the wood, and where a number of *Libellula quadrimaculata* could almost always be found busy over domestic affairs. The Black Wood, although on a fairly steep hillside, is excessively damp, and the same may be said of the moorlands; and my own inclination is to believe that the species breeds in the wet mossy ground, and not in the ponds, although I admit it is difficult to conceive of so large a larva as *borealis* must have, being altogether comfortable in such situation.

Cordulia arctica has an altogether different flight to *Æ. borealis*, and is much easier to catch. Our difficulty with this species was to find specimens, and altogether we only managed to secure some sixteen examples among us out of perhaps twice that number seen. I do not think we saw a single specimen in the Black Wood, although all were taken on the higher and generally more open ground in the immediate vicinity. Still they were almost invariably seen near trees, and some certainly in the thick plantation of firs above the Black Wood. A common habit the species had was to ascend spirally to a considerable height, generally near a tall tree, and unless netted on its first rising from the ground was usually lost. The first day on which we saw the species, evidently when it was just beginning to emerge, Mr. King had the good fortune to secure six in a very short time; but no other similar fortune occurred to any of us, our captures afterwards being generally singly, and at long intervals. The other dragonflies taken were comparatively of less interest. The local *Leucorrhinia dubia* was common on the ponds, and about the heath near the lochan Rusg-a-Bhiorna; and the pretty and variable *Libellula quadrimaculata* was abundant on both the high and low grounds. The fine *Cordulegaster annulatus* was common on the heaths, a beautiful object as it flew leisurely in the sun, its golden rings showing out conspicuously. A curious *Æschna juncea* was taken, so much like a *borealis* that it may be a hybrid, especially as no other *juncea* occurred to any of us, and it was early for the species. The smaller species were represented by *Pyrrhosoma minium* and *Agrion cyathigerum* in fair quantity.

A trichopteron we were all anxious to take was the very rare *Limnophilus elegans*, but all our searching resulted in the capture of two specimens only, one by Mr. Morton, the other by Mr. King. As both were rather worn, probably we were a little late for it. Another interesting species in this group was *Apatania wallengreni*, which was found to be fairly common by beating trees on the side of Loch Rannoch, which as yet seems to be its only known British locality. The other Trichoptera included *Phryganea obsoleta*, several on Rusg-a-Bhiorna; *Neuronia ruficrus*, a few on the moors, &c.; *Colpotaulius incisus*, *Grammataulius atomarius*, *Limnophilus flavicornis*, *L. griseus*, *L. sparsus*, *L. centralis* and *L. luridus*, *Stenophylax lateralis*, *Philopotamus montanus*, *Plectrocnemia conspersa*, and *Rhyacophila dorsalis*.

Among the Perlidæ, we had one day probably a "record take" of *Isogenus nubecula*, which we found in great profusion by turning over stones close to the water on the loch-side; often six or seven specimens were found under a single small stone. The fine *Perla maxima* was found in a similar way under stones at the side of a broad burn which flowed close by the farm at which we were stopping; and beating trees along the burn-side produced *Chloroperla grammatica*, *Isopteryx torrentium*, *I. tripunctata*, *Tæniopteryx risi*, *Leuctra fusciventris*, *Nemoura variegata*, *N. cinerea*, and others, including a *Hemerobius* which I have been unable to determine.

Mr. Briggs was the only one of us who paid any attention to the Ephemeridæ, and he had his reward in the fortunate discovery of two species which have since been determined as quite new to Britain. One of them (*Leptophlebia meyeri*) attracted the notice of all of us, from its abundance near the lochan Rusg-a-Bhiorna; but of the other species (*Ameletus inopinatus*) Mr. Briggs seems to have taken only one specimen, on the shore of Loch Rannoch (see Ent. Mo. Mag. March, 1899, p. 69). *Tettix bipunctatus* occurred on the moors, but was the only orthopteron of which note was taken.

Lepidoptera were regarded as of only very secondary importance in the daytime, and practically only such species as came in our way when working at the other orders were taken, except, indeed, on several occasions when Mr. William Reid, of Pitcaple, joined us. Of butterflies, *Argynnis euphrosyne* and *Thecla rubi* forced attention by their abundance, the latter always among bilberry, on which, at Rannoch, its larva feeds. The Bombyces were represented by plenty of both larvæ and imagines of *Bombyx callunæ*, and I netted a beautiful male *Saturnia carpini* so late as the third week in June; a large batch of eggs of the species were hatching on ling just about the same time, so it had probably been on the wing for a considerable period. Larvæ and cocoons of *Orgyia fascelina* were also not uncommon on ling, and a few larvæ of *Trichiura cratægi* occurred. A fair number of Geometræ were picked up. *Eupithecia satyrata* var. *callunaria* was abundant, and *E. nanata* and *E. pumilata* fairly common, many of the latter being very highly coloured. *Melanippe tristata* was common, but, from its brown colour, not nearly so conspicuous as our blacker Yorkshire form; *M. hastata, Macaria liturata, Fidonia carbonaria* worn and apparently nearly over; *Scodiona belgiaria*, much paler and quite a different looking species to our Yorkshire moth; lovely forms of *Thera variata, Emmelesia blandiata*, and many others. Larvæ in this group included a very curious *Crocallis elinguaria*, in pattern and colouring a perfect imitation of the lichen-covered rail on which I found it resting, though no doubt it had come from an overhanging, also lichen-covered, tree; it produced a very pretty variety of the moth, unlike any other I have seen. *Ellopia fasciaria* and *Thera firmata* were beaten in plenty from pines, *Geometra papilionaria* on alder, *Thera juniperata* on juniper, and many others. We did not work at all for *Sesia scoliæformis* and *Pachnobia alpina*, but Mr. Reid was taking pupæ of the former and larvæ of the latter in some quantity at the time of our visit. Of Noctuæ observed in the daytime, *Anarta melanopa* occurred in abundance on one of the mountains, but, owing to the nature of the ground and the wild flight of the insect, not many were caught. A few *A. cordigera* were also about, but the species was evidently getting over; whilst *A. myrtilli* occurred sparingly on the moors. *Phytometra ænea*, fine and very highly coloured, was common; and from tree-trunks, &c., *Acronycta menyanthidis* and *A. glauca* were occasionally picked. Among the other genera, the pretty *Euchromia mygindana* was common among bilberry above the Black Wood; and *Pyrausta purpuralis, Botys fuscalis, Scoparia ambigualis, S. muralis, Sericoris daleana, Cnephasia musculana, Phoxopteryx biarcuana, P. myrtillana, Pterophorus acanthodactylus*, and many others were observed. During our second week Mr. King and I sugared on most evenings, and it was on those occasions that our interest became really centred on Lepidoptera. Noctuæ were attracted in fair quantity, and especially interesting to myself, from the circumstance that I had never before seen them alive in a wild state, were *Hadena rectilinea* and *Acronycta myricæ*. Both species were in perfect condition, and the former was plentiful; a beautiful object it was on the sugared trees, though on some of the lichen-covered trunks they were so difficult to see that over and over again they would have been missed had it not been for a common habit they had of dropping to the ground when the light was turned on them. *Myricæ* only occurred during our last few days, and was just getting well out. In point of numbers *Hadena adusta* took a good lead, and was in fine order, many of the specimens being very large and almost quite black. They were carefully looked over on the trees on the chance of *Crymodes exulis* being among them, but none of us were fortunate enough to get one. A plentiful and very interesting species too was *Rusina tenebrosa*, the specimens being generally smaller and much darker than any I had seen elsewhere; many of them were almost black with scarcely any marking, and quite a contrast even to our West Yorkshire examples. Very pretty forms of *Hadena pisi* and *H. dentina* occurred in moderate numbers, and a very welcome and not uncommon visitor was *H. contigua*. Only one *Acronycta leporina* was taken, perfectly fresh, and, to our surprise, of quite the pale southern type. The other visitors included *Cymatophora duplaris* and very dark *C. or*, *Acronycta menyanthidis*, very pretty forms of *Xylophasia rurea*, *Agrotis porphyra*, *Gonoptera libatrix*, and a number of other ordinary species. *Platypteryx lacertula* or *P. falcula* (both, I think), *Ephyra pendularia*, and other common species were also taken at dusk. Mr. King and Mr. Reid had one evening's larva-hunting high up in the Black Wood, and found, mostly on bilberry, those of *Fidonia pinetaria* in plenty, a few of *Noctua sobrina* and *N. neglecta* (Mr. Reid), *Cloantha solidaginis* (?), *Cidaria populata*, and some, also on bilberry, which I think (and I had some feeding at home at the time) were *Oporabia filigrammaria*, though I am not aware that this species has been recorded from Rannoch. We were told that larvæ of *Aplecta occulta* had been common shortly before our arrival, but, judging it was then too late, we made no attempt to search for any. We ascertained too that a few imagines of *Petasia nubeculosa* had been taken in the spring, but that the species had been much scarcer than in some previous years.

The fact that *Hadena adusta* and *Rusina tenebrosa* were so much darker in the Highlands than in the West Riding of Yorkshire showed that, notwithstanding all that has been said and written during the past dozen or more years as to the probable cause of melanism in Lepidoptera, we know but little more than we did at the beginning. Both the species occur, the former commonly, in the same wood near my residence, in which are found almost absolutely black *Boarmia repandata*, *Amphidasys betularia*, *Hypsipetes elutata*, *Cidaria immanata*, *Miana strigilis* (only a very occasional specimen of this being other than var. *æthiops*), and other species; and yet on the same ground *Hadena adusta* and *Rusina tenebrosa* are paler than at Rannoch, where the air is as nearly absolutely free from smoke or anything of that character as possible. On the other hand, I believe all the species I have mentioned as being so dark here are, excepting possibly *Miana strigilis*, of quite ordinary type at Rannoch. The much paler *Melanippe tristata*, too, gave the moth quite a different appearance when on the wing to ours; and the specimen of *Acronycta leporina* was of the palest South of England form, whereas Yorkshire specimens are all of the dark variety *bradyporina*. The only *A. psi* taken was also an exceptionally pale one. In the Huddersfield wood alluded to, *Cidaria populata* occurs plentifully, and on the near moorlands is in the greatest profusion, but I have never yet seen one at all approaching the dark unicolorous Highland form.

Rannoch is a charming collecting district, but to those interested in Lepidoptera only I should recommend the last week in June and through July as likely to be much more productive than the time of our visit.

Crosland Hall, Huddersfield: March 3rd, 1899.

NOTE ON THE LIFE-HISTORY OF *NEMEOBIUS LUCINA.*

By Rev. A. M. Moss, M.A.

While taking *Nemeobius lucina* last summer at Witherslack, I captured a pair "in cop.," the female of which I preserved alive in a glass-topped box, kept in the sunshine. After providing her with a couple of primrose leaves laid on soil, I was pleased to find that she fell in with my suggestion and laid me a score of eggs. They were deposited at intervals, about half a dozen at a time, spotted about the leaves, and all on the under side, the furry and uneven texture of the leaf being well adapted for this purpose, and affording an excellent shelter. From pale green they changed to pink; and in a fortnight or more, previous to emergence, the shells which had become semitransparent revealed little leaden-coloured larvæ curled up within.

Never had I less difficulty in breeding any insect; and I would strongly recommend any who are in want of a good series of *N. lucina*, to remember the story of the goose that laid the golden egg, next time a female turns up. Only one larva died in moulting, and one I preserved. I kept them in a flat biscuit tin on soil, very slightly moistened, and all I had to do was to supply them with a fresh primrose or cowslip leaf once a week. They pupated in due course, attached with the usual silken band, some to the leaves and some to the sides of the tin.

Having seen several records of the autumnal emergence of this species in captivity (*vide* Entom. xxviii. 338), I experimented with three or four pupæ during the last ten days of September, placing them beside a kitchen boiler. At the end of that period, no longer possessing any facility for forcing, I replaced them with my other pupæ in the more or less normal temperature of my sitting-room. No change was yet observable in their appearance, the pupæ remaining white like the rest. However, the process of formation had evidently being going on, for in another fortnight three had begun to change colour. The length of time between this stage and the point of emergence varied from seven to fourteen days or thereabouts (*cf.* an interesting article in Ent. Rec. vi. 257); and the noticeable changes were three in number as follows:—

(1) More opaque, and creamy in colour.

(2) Faint pink and grey square marks on wing-cases, and thorax darkening.

(3) Uniform dark leaden colour all over.

The removal to cooler temperature apparently did not affect them, except perhaps in retarding their emergence for a few days.

Furthermore, I found that at intervals though November and December all my other unforced *lucina* were forming, the ordinary temperature of my room (without any moisture) evidently being sufficient to bring them out before their time. So, out of eighteen larvæ I have seventeen perfect imagines (the majority females), only one producing a malformation.

NOTES AND OBSERVATIONS.

Lycæna arion.—I have experience of larvæ of this species for some three years, rearing them (up to a certain point) from the ova laid by females taken by myself; and although I have hitherto failed to get them to pupate, I have had larvæ nearly, if not quite, full-grown. The larva described by Mr. E. B. Nevinson in the last number of the 'Entomologist' (*ante*, p. 71) does not accord with those I have had. The colour of the larvæ I have had was more or less lilac, this colour becoming more brilliant as the larvæ increased, until it might almost be described as violet. At this period they spun together the seed-heads of the thyme, but I never succeeded in finding them alive in the spring following. The imago would scarcely be over by Aug. 18th, the date on which Mr. Nevinson's larva was probably full-fed.—A. B. Farn; Mount Nod, Greenhithe, March 2nd, 1899.

Note on the Larva of Phorodesma smaragdaria. — Some time since I had the opportunity of observing the method by which a larva of *P. smaragdaria* dresses itself with the fragments of food-plant which form its protective covering. When it has changed its skin, the larva is seen to have a number of tubercles on its back; these tubercles secrete a sticky fluid. Having, of course, shed the old adornment with its skin, and requiring to redecorate itself, it at once proceeds to do so by seizing a fragment of the food-plant attached to its cast-off skin, and, removing this, places it on its back, moving it to and fro until the particle adheres to one of the tubercles, through the medium of the sticky exudation. As soon as the first fragment is fixed, it proceeds to remove a second piece from the cast-off skin, and places this on its back as it did the first; this process is continued until the larva is satisfied with the amount of covering it has acquired. —H. S. Fremlin; Grosvenor Laboratories, Chelsea Bridge.

The Coccidæ of the Sandwich Islands.—Last year (Entom. xxxi. 239) I gave a list of Sandwich Island Coccidæ, and indicated five species as being only known from thence. Already, three of these have turned up elsewhere; *Kermicus* (formerly *Sphærococcus*) *bambusæ* has been found by Mr. Green in Ceylon, by M. d'Emmerez de Charmoy in Mauritius, and by Dr. Noack at Campinas, Brazil; *Dactylopius vastator* has been identified by Professor J. D. Tinsley from Mauritius, where it was collected by M. de Charmoy; and *Mytilaspis hawaiiensis* has been found by Mr. Koebele at Amoy, China. Two species are to be added to the Sandwich Islands list. On Feb. 3rd, 1899, Mr. A. Craw found a palm (*Seaforthia elegans*), which arrived at San Francisco from Honolulu, to be infested with Coccidæ. I have examined the material, and it is *Aspidiotus* (*Evaspidiotus*) *transparens*, Green, and *A.* (*Hemiberlesia*) *greenii*, Ckll., with also a very young *Icerya*, indeterminable.

Corrections.—Ante, p. 12, for "Two new genera of Lecaniine Coccidæ" read "Two new genera of Coccidæ." P. 13, at bottom, for "*Aspidiotis*" read "*Aspidiotus*." — T. D. A. Cockerell; Mesilla Park, New Mexico, U.S.A., Feb. 14th, 1899.

Ichneumons Wanted.—Will lepidopterists and others who may breed or otherwise capture ichneumons during the coming season be so kind as to send them, with, where possible, their host's names, to Claude Morley, F.E.S., Crescent, Ipswich, who is commencing the study of these interesting parasites?

Cucullia chamomillæ. — A correspondent (*ante*, p. 20) writes requesting information upon the finding of larvæ of *Cucullia chamomillæ*. This at once throngs my mind with many pleasant, and in the main successful, hunts after the species; and I hasten to contribute my small experience, with the hope that it may be of use to him and others. I first made the acquaintance of *chamomillæ* larvæ ten years ago, at Rossall, near Fleetwood. The chamomile grew in abundance on a part of the sea wall, and I traced the whereabouts of my first caterpillar by the frass lying on the sand under one of these plants. It was full-grown, very brightly coloured, and completely hidden in its green thicket. Afterwards, however, I found others quite exposed, even at this stage of growth. Roughly speaking, for the first half of their brief larval existence they always live exposed, and seem to rejoice in lying in a half-circle on the crown of unexpanded flower-heads. Green is then the predominant colour, with a varying degree of white and darker markings, not unlike the larva of *Anarta myrtilli*. With its growth the caterpillar becomes a very beautiful object; red or yellow, and in some specimens both, being added to the former colours, and the skin becoming smooth and shining. Like others of the genus, *chamomillæ* is endowed with electric activity. The larvæ, at any rate in their earlier stages, are perfectly easy to find, if one is fortunate enough to hit on the locality at the right time; and with this species the last consideration is all-important, for I know of no larva that possesses more marvellously quick growing powers. Finding larvæ of an inch in length, I have had them full fed and about to bury in a week's time.

Let me refer my reader to Newman's excellent notes on the species—'British Moths,' page 435. I can corroborate exactly what he gives as regards date; possessing records in 1897, a somewhat backward season, of both small and full-grown larvæ on June 20th and 28th. I think the middle of June may be looked upon as the time to begin searching. It is certainly a fastidiously local species; and on this point again I find Newman correct to the letter, having taken it in dockyards in the heart of Birkenhead. I have also taken it on the sand at Abergele, at Crosby near Liverpool, and in abundance at Bidston, Birkenhead, and near the mouth of the Wyre, Fleetwood; which experience leads me to suppose that it has a preference for the coast.

One word more in respect to the pupæ. Until 1897 I had never succeeded in rearing a single moth, the pupæ always drying up just before emergence. In that year I bred a fine series of fourteen by keeping them buried in a tin of moistened soil. They all emerged in November and December, some being expedited by gentle forcing. I have lately been subjecting a greater number of *C. asteris* pupæ to the same treatment, with the fatal result that nearly all have succumbed to mould. Truly one lives and learns. The moral, therefore, seems to be—keep *asteris* (and I might also add *umbratica*) dry, for you cannot bring them out before their time; but leave *chamomillæ* buried in damp sandy soil.—(Rev.) A. M. Moss; 12, Greenside, Kendal.

Curious Instance of "Assembling."—I thought perhaps the following might prove of some interest. On August 2nd, 1896, a female specimen of *Orgyia antiqua* emerged in the breeding-cage in my bedroom. The window of the room was closed, but on going into it about 4 p.m. I was surprised to find three males of *O. antiqua* flying wildly about. The door was open, and the only open window was on the staircase about six stairs further down, and at right angles to the wall of my room, in which the door is. The window was only open three or four inches.—F. M. B. Carr; 46, Handen Road, Lee, S.E.

Larva Devouring Dead Moth.—In looking through my diary for 1897, I see the following note on a larva of *Chelonia* (*Arctia*) *caia*. I placed a good-sized larva of *C. caia* in a box containing a dead female *Amphidasys betularia*, and forgot to put in any food for it. When I opened the box next day I found that the larva had nearly entirely demolished the wings of the dead moth, and had also eaten part of the body.—F. M. B. Carr.

The Preservation of Wicken Fen.—In an interesting article in 'Science Gossip' for March, Mr. Herbert Goss asks for the co-operation of naturalists in assisting the National Trust to secure such portions of Wicken Fen as may be offered for sale from time to time.

CAPTURES AND FIELD REPORTS.

Pieris rapæ in January.—On March 7th I saw a specimen of *P. rapæ* sitting upon a wall drying its wings, and quite close to the chrysalis from which it had just emerged. Is this not very early?—Marjorie Mathew; Royal Naval School, Twickenham, March 15th, 1899.—[Mr. Kirkaldy, who recorded the occurrence of a specimen of *P. rapæ* on January 29th (*ante*, p. 73), informs us that another example was taken in the same house some time during the first week in March.—Ed.].

Lepidoptera Captured at Light in 1898.—In accordance with my annual practice, I send a list of a few additional insects taken at light during the past year, and not previously so recorded by me, viz.:—*Sphinx ligustri*, *Hylophila bicolorana* (female), *Hepialus sylvanus*, *Notodonta chaonia* (female), *Xylophasia rurea*, *Dianthœcia carpophaga*, *Xylina ornithopus*, *Plusia pulchrina*, *Rivula sericealis*, *Zonosoma annulata*, *Cledeobia angustalis*, *Scoparia resinea*, *Amblyptilia acanthodactylus*, *Tortrix cratægana*, *T. xylosteana*, *T. heparana*, *T. ribeana*, *T. forsterana*, *Dichelia grotiana*, *Pædisca rufimitrana*, *Micropteryx subpurpurella*, *Depressaria applana*, *Dasycera sulphurella*, *Endrosis fenestrella*, *Ornix betula*, *Lithocolletis pomifoliella*, *L. cramerella*. On the whole the season for light was a very poor one, but the following were more plentiful than usual, viz.:—*Notodonta trepida*, *N. trimacula*, *N. dictæoides*, *Hypenodes albistrigalis*, *Boarmia abietaria*, *Cidaria dotata*. — G. F. Studd: Oxton, Exeter, Feb. 25th, 1899.

Chœrocampa celerio in 1898.—On January 3rd I was shown a fine example of *C. celerio*, which was taken by a chemist at Southborough, near Tunbridge Wells, in October. It flew in at his shop-door, doubtless attracted by the light, and he immediately secured and chloroformed it. It was shown to me on my return home, by the Rev. R. Bull, of St. Andrew's, Southborough, to whom the chemist had given it, and whose collection it now adorns.—H. W. Shepheard-Walwyn; West Downs, Winchester.

Macroglossa stellatarum in 1899.—I think the following rather a curious appearance of the above-mentioned moth. On the 3rd of January last I was at the Hereford Hunt Ball, and during supper I noticed a specimen of *M. stellatarum* sitting upon the collar of a gentleman at the same table. I called my partner's attention to it, and he obtained an empty match-box from a waiter and secured it. This testifies to the extraordinary mildness of the winter in this neighbourhood up to Jan. 3rd.—E. Bertha Vaughan; The Skreen, Erwood, R.S.O., Radnorshire, South Wales.

A medium-sized specimen of *M. stellatarum* was taken here on Feb. 18th by the Rev. A. B. Sole. The insect was hovering over the blossoms of yellow jasmine, and appeared to be a freshly-emerged example.—H, W. Shepheard-Walwyn; West Downs, Winchester.

Notes from North Wales: on the Season 1898. — I found Lepidoptera much scarcer in North Wales during last year than has been the case in either of the three preceding seasons. Not until September could insects be said to be at all abundant. The early moths were conspicuous by their absence; while nightly visits to the sallows during the last fortnight in March produced nothing but the commoner species of *Tæniocampa*. Of *T. munda*, so abundant in 1897, I saw not more than two or three altogether. On April 2nd I found *Amphidasys strataria* on oak trunks; and from ova deposited by one of the females I managed to rear a large brood during the summer. The resemblance of the larvæ to the dark grey twigs of oak was very striking. A week later I was at Capel Curig in Carnarvonshire, and found moths fairly common at the sallows. *Pachnobia rubricosa* occurred most frequently of the spring moths, along with an occasional *Tæniocampa gracilis*. Several hybernated species also turned up, including *Triphosia dubitata*, and odd specimens of *Agrotis suffusa*, *Oporina croceago*, *Calocampa vetusta*, *C. exoleta*, *Xylina socia*, and *Cidaria miata*. One specimen of *Asphalia flavicornis* was attracted by light. On April 21st I observed, near Portmadoc, specimens of *Euchloë cardamines* and *Pieris napi*, together with many hybernated *Vanessa io*. On the following day I boxed a lovely specimen of *Asphalia ridens* on the side of the road between Barmouth and Machynketh. The first three weeks of May were cold and wet, and insects in the neighbourhood of Newtown were very scarce. In fact, Rhopalocera have been very scarce here all the season, with the exception of *Pieris brassicæ and P. rapæ*, which were most abundant during the autumn. *Vanessa c album* I saw once, on May 7th. Common Geometræ began to turn up on May 25th, when I also took *Cymatophora duplaris* and *Pterostoma palpina*. *Macroglossa bombyliformis* was very scarce; I took four specimens on June 3rd and 5th, all at flowers of *Pedicularis sylvatica*. Noctuæ began to turn up at light on June 7th; and during the rest of the month *Leucania comma*, *Grammesia trigrammica*, and *Hadena dentina* occurred in some numbers. Sugar was a complete failure during June and July. Two visits during the same months to Dinas Mawddwy, a charming village among the mountains in the south of Merionethshire, produced little of note. In 1897 the pine woods there swarmed with Geometræ, such as *Bupalus piniaria*, *Macaria liturata*, and *Thera firmata*; but this year they produced nothing beside *Larentia viridata*, *Melanippe montanata*, and *Hepialus hectus*. On the moorland above the village I came across *Plusia festucæ* and *Pseudoterpna pruinata*. *Melanippe tristata* was common during the first week in July in the locality where I discovered it last year, as was also *Melitæa artemis* a fortnight earlier. During July light was more productive, among the better moths that turned up being *Plusia iota*, *P. pulchrina*, *Neuria reticulata*, *Cidaria prunata*, *C. dotata*, and *C. associata*. During August I was in the South of England; but on my return here in September I tried sugar again. I began on September 13th, and sugared almost every night until October 24th. The trees I sugared were some half-dozen apple trees in my own garden, and a number of oak trees in a small copse on a hill at the back of my house. On the first few nights *Amphipyra pyramidea* was common, but worn. *Anchocelis pistacina* was the most abundant moth, and occurred in every conceivable variety. *A. rufina* and *A. litura* were also quite common; but of *A. lunosa* I got but two. The best moths I took were *Xanthia aurago* and *X. gilvago*. Of the former I secured about twenty specimens, all, except one, in the copse above mentioned; while of the latter I got eight or nine examples, which came singly on separate evenings, and all but one in the garden. Two or three specimens each of *Agrotis saucia* and *A. suffusa* also turned up, with a few *Hydrœcia micacea* and *Agriopis* *aprilina;* while *Amphipyra tragopogonis, Triphæna comes, Orthosia macilenta, Xanthia circellaris, Miselia oxyacanthæ,* and *Phlogophora meticulosa* were all very abundant. During October *Cerastis vaccinii, C. ligula* (= *spadicea*), and *Scopelosoma satellitia* largely replaced them. Occasional specimens of *Caradrina quadripunctata, Agrotis segetum,* and *Orthosia lota* complete the list. Two of the best nights were September 17th and 27th. The former was a mild, still night; whereas on the latter the wind was N.N.W. and cold, with bright moonshine. *Himera pennaria* occurred frequently at light in October; and *Cheimatobia brumata* was very abundant here and there on mild November evenings.—ALFRED S. TETLEY; Llwynon, Newtown, N. Wales.

A LOCUST IN A CAULIFLOWER.—Yesterday, February 26th, my cook informed me that she had found a very large and strange insect in the leaves of the cauliflower she was preparing for cooking. As she was certain it was not a dragonfly, I requested her to look for it in the dustbin, where she had thrown it with the leaves. In a few minutes a locust was brought to me alive and uninjured; it is of full size, and I am keeping it in a warm place. I am informed that the cauliflower came from Italy.—H. PERRY DUPREY; Fort House, Green Lanes, Stoke Newington, N.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON. — *February* 15*th*, 1899.— Mr. G. H. Verrall, President, in the chair. Mr. James E. Collin, of Sussex Lodge, Newmarket, was elected a Fellow of the Society. Mr. B. A. Bower exhibited perfectly black melanic examples of *Boarmia abietaria*, Hb., bred from ova laid by a female of the ordinary Box Hill form, which was captured on the 9th of July, 1897. They were part of a brood of seventeen, seven of which were of the black aberration; and for comparison with them he showed specimens from Box Hill, South Devon and the New Forest. Mr. Blandford exhibited some lumps of common salt burrowed by larvæ of *Dermestes vulpinus*, to which he had incidentally referred in a letter just published in "Nature." They were sent to him by Sir H. T. Wood, Secretary of the Society of Arts, who received them from a correspondent writing from a preserved-meat factory in Australia. It was a mistake to suppose, as this correspondent had done, that the larvæ burrowed in the salt for the sake of obtaining food; he himself had on various occasions called attention to depredations of *Dermestes vulpinus*, arising from a habit the larvæ had of burrowing through different materials in order to find a shelter in which to undergo pupation, though this was the first time that salt, as a substance attacked in that way, had come under his notice. Mr. J. J. Walker, in remarking upon the exhibit, said he believed one of the earliest references to injuries caused by *Dermestes* was to be found in "The Last Voyage of Thomas Candish," published in Hakluyt's Collection of Voyages, where there was an interesting though somewhat exaggerated account of certain worms which, bred from a stock of dried Penguins, proceeded to devour the whole of the ship's stores, and then to gnaw into the timbers, creating great alarm lest the ship should spring a leak. This voyage took place in the year 1593; and the worms, he thought, could only have been the larvæ of *Dermestes vulpinus* or some closely allied species. Dr. T. A. Chapman read a "Contribution to the Life-history of *Micropteryx* (*Eriocephala*) *ammanella*, Hubn."

March 1*st*.—Mr. G. H. Verrall, President, in the chair. Mr. G. J. Arrow, of the British Museum (Natural History); Mr. G. B. Chalcraft, of Leicester; Mr. C. E. Collins, of Stoneham, Calcot, Reading; Mr. Percy W. Farmborough, F.Z.S., of Lower Edmonton; Mr. Montague Gunning, of Narborough, Leicester; Mr. Harry Moore, of 12, Lower Road, Rotherhithe; and Mr. H. S. Woolley, of 7, Park Road, Greenwich, were elected Fellows of the Society. Mr. J. J. Walker exhibited a specimen of a rare British beetle, *Quedius longicornis*, Ktz., recently taken at Cobham Park, Kent. Mr. M. Jacoby exhibited a Halticid beetle from Sumatra, of the genus *Chalænus*, Westw., and called attention to the remarkable position of its eyes, these organs being placed at the end of two very distinct lateral processes of the head, somewhat resembling the stalked eyes of crabs and other Crustacea. He said this character was peculiar to the male sex, and was very exceptional in Coleoptera, not being met with in any other genus of Phytophaga, and only occurring in a few Anthribidæ, and in isolated cases in one or two other families. He also showed a beetle from Peru, which was sent to him in a collection of Phytophaga, and which, superficially, was very like certain members of that group; but, from the structure of the antennæ and other characters, it appeared to be out of place in the Phytophaga, and probably belonged to some other family. Mr. Gahan remarked that this beetle, to whatever family it might prove to belong, was very interesting, not only from its structural peculiarities, but also from the fact that it had the colour and markings characteristic of certain species of Galerucidæ, a family to which it undoubtedly was not in any way closely related. This fact seemed to show that it was a mimetic form, and thus helped to explain the present obscurity surrounding its affinities. Mr. J. J. Walker read a short extract from the account given in "The Last Voyage of Thomas Candish," to which he had referred in the course of his remarks on Mr. Blandford's exhibit at the previous meeting. Mr. G. J. Arrow contributed a paper "On Sexual Dimorphism in Beetles of the Family Rutelidæ," and sent for exhibition a series, including both sexes, of six species of *Anomala*, selected to illustrate the subject of his paper.—J. J. Walker and C. J. Gahan, *Hon. Secs.*

South London Entomological and Natural History Society.—*Annual Meeting*, *Jan.* 26*th*, 1899. Mr. J. W. Tutt, F.E.S., in the chair. A very satisfactory balance-sheet was adopted, and the Council's Report, giving a résumé of the past year's work, having been read, the following gentlemen were declared elected to fill the various offices in the Society:—A. Harrison, F.L.S., F.E.S., &c., President; Dr. Chapman, F.E.S., and J. W. Tutt, F.E.S., Vice-Presidents; T. W. Hall, F.E.S., Treasurer; H. A. Sauzé, Librarian; W. West, Curator; Stanley Edwards, F.L.S., F.E.S., and Hy. J. Turner, F.E.S., Hon. Secretaries; R. Adkin, F.E.S., F. Clark, H. S.

Fremlin, M.R.C.P., F.E.S., W. J. Lucas, B.A., F.E.S., H. Moore, A. M. Montgomery, and R. South, F.E.S., Council. The President then read his Address.

February 9*th*.—Mr. A. Harrison, F.L.S., President, in the chair.—Mr. Russell exhibited a specimen of *Plusia moneta* taken at Southend, near Catford, in July, 1898. It was noted how rapidly the species was spreading. Mr. Adkin, a series of *Hadena pisi* from Aberdeenshire, with S. English forms for comparison. They were of a blackish brown or dull purple, showing a strong contrast to the red English form. Mr. Lucas, a series of *Rhyparobia* (*Panchlora*) *maderiæ* taken at Kew Gardens in a packet received from the Belgian Congo, and contributed notes on its distribution. Mr. Main, specimens of the brilliant Coleopteron, *Aspidomorpha sanctæ-crucis*, from Bombay, which had been preserved in a dilute solution of formalin. A discussion ensued as to the amount of formalin in the solution, and also as to its action. It was thought that no more was necessary than just sufficient to sterilize the water, say 1 per cent. Mr. Harrison, a bred series of *Pseudoterpna pruinata* (*cytisaria*) from New Forest larvæ. Mr. Fremlin read a note received from Mr. Chadwick, in Devonshire, giving an account of an observation of *Amphipyra pyramidea* swimming across a stream at least thirty yards wide. In the discussion which ensued, Mr. Tutt and others gave various instances of the swimming capabilities of several species of Lepidoptera. Dr. Chapman read a paper entitled "Some Points in the Evolution of the Lepidopterous Antennæ," illustrating his remarks by blackboard diagrams and numerous figures of antennæ sculpture. A discussion took place, and it was considered that the paper was one of the most important of the series of evolutionary studies which Dr. Chapman had for some time been contributing to various societies and magazines.

February 23*rd*.—Mr. A. Harrison, F.L.S., President, in the chair. Rev. F. H. Wood, Bromley Park, Kent, was elected a member. Mr. Sauzé exhibited a specimen of the Heteropteron, *Acanthosoma hæmorrhoidalis*, taken alive a few hours before at Brixton. Mr. Harrison exhibited a long series of *Parnassius apollo*, both bred and captured, arranged to show the variation in the large central ocellus on the hind wings. He also exhibited series of *Papilio podalirius* and *P. machaon*, both species from Meiringen. Mr. West, of Greenwich, a long series of the four species of the Homopterous genus *Philænus*, including some hundred different varieties of the common garden spit-fly, *P. spumarius*. Mr. Moore, a preserved larva of *Papilio cresphontes* of North America. Mr. Step gave a series of notes and observations he had made during the last few years on our larger British Crustaceans, and he illustrated his remarks by admirable lantern slides from his own photographs.

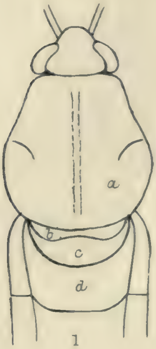
March 9*th*.—Mr. R. Adkin, F.E.S., Vice-President, in the chair. Mr. Adkin exhibited males, imagines, and cases of *Psyche villosella*, *P. opacella*, and *P. graminella*. Mr. Tutt communicated a paper on "The Nature of Metamorphosis."—Hy. J. Turner, *Hon. Report Sec.*

Cambridge Entomological and Natural History Society.—*February* 3*rd*, 1899.—Dr. Sharp exhibited a number of stag-beetles (Lucanidæ), from various parts of the world, calling attention to the trimorphism conspicuous among the males of many species. They differ not only in size, but also in the form of the mandibles, and can be usually placed in three well-marked groups in each species. He also exhibited some bees of the genus *Koptorthosoma* from Ceylon, in which in the female a cavity is formed in the anterior end of the abdomen by an involution of the skin. The abdomen is pressed so close against the thorax that in the normal position this cavity is invisible, but it can be seen by bending down the abdomen or by cutting it off. The cavity varies in form in different species, but is found throughout the genus in the female, and always contains a number of large *Acari*. It is not known whether these parasites have any connection with the development of the structure in question. Dr. Harmer exhibited an Amphipod Crustacean of the genus *Niphargus* found in a well at Norwich. This genus is only known to occur in deep wells, and in the complete absence of pigment from all parts of the body, including the eyes, it resembles a cave animal.—L. Doncaster, *Hon. Sec.*

Kendal Entomological Society.—*January* 9*th*, 1899. *Annual Meeting.*—The President in the chair. The following officers were elected for the year:—President and Secretary, Rev. A. M. Moss, M.A.; Vice-President, Mr. F. Littlewood; Treasurer, Mr. A. Graveson. The President gave as his Address a retrospect of the past years and the work of the Society since its foundation in June. Mr. Holmes moved the adoption of the Report, which is now being printed for circulation amongst the members.—Rev. A. M. Moss, *Hon. Sec.*

Birmingham Entomological Society.—*January* 16*th*, 1899.—Mr. G. T. Bethune-Baker, President, in the chair. Mr. R. C. Bradley exhibited two drawers from the type collection which had been filled, one with Tortices principally from Dr. P. B. Mason's collection, the other with Pyrales from his own collection and that of Mr. F. W. Moore. Mr. P. W. Abbott exhibited a series of *Camptogramma fluviata*, bred, from Devonshire; also *Heliothus armigera* and *Leucania vitellina*, from the same county. Mr. G. T. Bethune-Baker showed a box of Lycænids including forms of *Lycæna icarus*, *L. bellargus*, and *L. corydon*, from many localities in Europe and Turkestan.

February 6*th*. Mr. Bethune-Baker, President in the chair. *Annual Meeting.* The Annual Reports were presented, that of the Treasurer showing a smaller balance in hand than last year. Mr. G. T. Bethune-Baker, F.L.S., F.E.S., was reelected President, and Mr. P. W. Abbott Vice-President, and the other officers as follows:—Treasurer, Mr. R. C. Bradley; Secretary, Mr. C. J. Wainwright, 2, Handsworth Wood, Handsworth; Librarian, Mr. A. H. Martineau; other members of Council, Messrs. G. H. Kenrich, W. Harrison, H. Willoughby Ellis, and H. J. Sands.—Colbran J. Wainwright, *Hon. Sec.*



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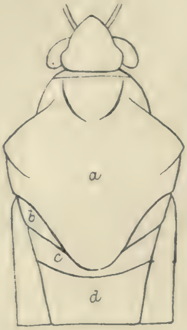

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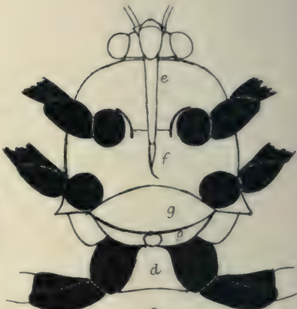

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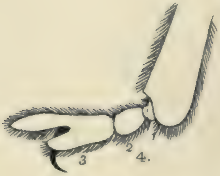

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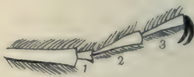

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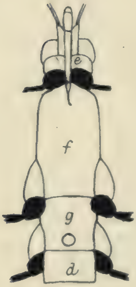

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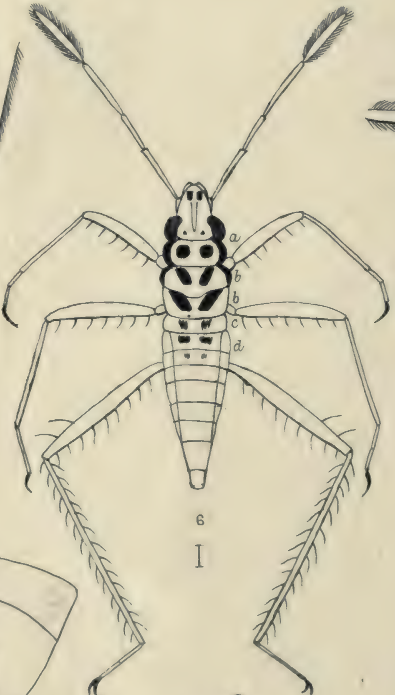

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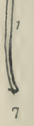

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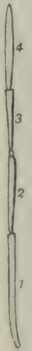

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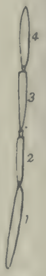

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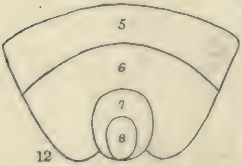

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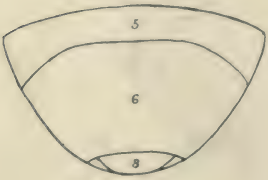

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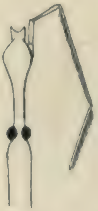

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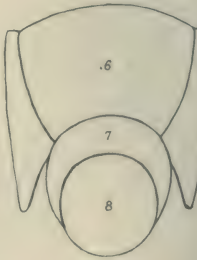

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G.W. Kirkaldy del. West, Newman lith

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NOTES ON *EMYDIA CRIBRUM*, L.

By Eustace R. Bankes, M.A., F.E.S.

In the course of his observations on this species in Entom. xxv. pp. 269–271 (1892), Mr. Fowler says: "Stainton's 'Manual' gives Blandford and the New Forest as localities, which I think decidedly wrong; I have a fair knowledge of each, but have never seen a specimen in either. It would be interesting to know whether it still exists in either of these localities." I believe I may safely say that *E. cribrum* has never to this day been taken, either in the immediate neighbourhood of Blandford, or in any part of the New Forest, although hundreds of ova have at various times been turned out in the latter district. Both these localities were entered in Stainton's 'Manual' on the authority of the late Mr. Frederick Bond, and both can be easily explained, thanks to information kindly given me by the Rev. O. P. Cambridge, who was an intimate friend and frequent companion of Mr. Bond.

1. "Blandford," as there used, really means "Bloxworth, Dorset," the foundation for the record being the fact, well known to Mr. Bond, that several single examples of *E. cribrum* were taken on Bloxworth Heath, by the Rev. O. P. Cambridge, in 1855. Bloxworth is about seven miles, as the crow flies, to the south of Blandford. Mr. Bond used often to stay with Mr. Cambridge at Bloxworth Rectory, and always, for strategical reasons, gave "Blandford" (the then post-town of Bloxworth) as the locality for the more important captures made by himself, or others, at Bloxworth, or elsewhere in that rather wide district. Mr. Cambridge tells me that he knows as a fact that

Mr. Bond was never in the Blandford district—properly so called—in his life.

2. "New Forest" should be interpreted to mean "near Ringwood," the exact spot of heathland where Mr. Bond used, year after year, to work for the insect, accompanied by George Gulliver and sometimes by the Rev. O. P. Cambridge, being well known to me. It is situated in Hampshire, though very near the boundary of Dorset, and although not within the limits of the New Forest, it is only about four miles from the western edge of that tract. In 1892, for the second time within comparatively recent years, the range of heath in which it lies was entirely destroyed by an extensive fire.

I fully agree with Mr. Fowler that the insect is only single-brooded in this country. No doubt the reason why some have thought that there is a second brood is because, in certain of its colonies, the moths always emerge several weeks earlier than in others, which lie in the same part of the country, and in some cases even further south. Thus, it has been taken by my friends or myself in May (in the exceptionally early season of 1893), June, July, and August, but, in my experience, the moths in any given colony emerge at about the same date, and are, in that particular spot, only obtainable during one or two consecutive weeks in the course of the year.

As regards the food-plants of the larva, we learn, from some interesting notes in Ent. Mo. Mag. 2nd ser. i. pp. 255–6, and p. 298, some of the following facts, the rest having been communicated to me (*in litt.*) by friends:—

1. On the Continent.—Larvæ found by Mr. G. T. Baker in Switzerland feeding "on a broadish-leaved grass," there being no heath in the vicinity, were successfully reared by him on various kinds of grass, while Herr Konewka, of Berlin, who in nature has found the larva on *Calluna vulgaris* only, reared the moths, from eggs laid in confinement, by feeding the larvæ on lettuce leaves. In Lep. der Schweiz. p. 80 (1880), Professor Frey says, "Larva on *Calluna* and low plants."

2. In England.—The following curiously different results have been obtained by those observers who have tried to rear larvæ, resulting from ova laid by females captured on the heaths in West Hants or East Dorset:—The Rev. E. N. Bloomfield found that the larvæ apparently would not touch *Calluna vulgaris* or *Erica cinerea*, but began to feed on *Poa annua* and *Aira flexuosa*, after which their lives were ended by an accident. Mr. H. Goss got larvæ to feed well on both *Erica cinerea* and *E. tetralix*, but they all died off when *Calluna vulgaris* was given them as a substitute. Mr. J. H. Fowler fed some young larvæ on lettuce for a time, but they all died off; he could not induce them to feed on any kind of heath or lichen, and fancied that a

wiry kind of grass that grows on the heaths might be the natural food-plant. Mr. W. H. B. Fletcher, to whom I have sent all the eggs that I have obtained, found that the young larvæ fed well for a time on *Calluna vulgaris*, and has more than once reared them on it until they went into hybernation, but never further. One of the New Forest collectors—a member, I believe, of the well-known family of Gulliver—told me that he had succeeded in rearing the larvæ on a mixed diet of *Calluna vulgaris* and lichen, but that they invariably pine away and die unless supplied with lichen in the spring; he added that they should also be kept out of doors. I know no one else who has bred the moth from British larvæ.

From the above facts it appears probable that one reason why *E. cribrum* is so extremely local, and the chief reason why it has proved so very difficult to rear in confinement in this country is that British larvæ of it must have lichen, as well as ling (which I am inclined to think is its usual food-plant) or heath, when feeding up in the spring; perhaps the necessary lichen is a grey one that grows on the stems of ling and heath in certain spots on the moors frequented by the insect.

Mr. Fowler (*l. c.*) says he has noticed that *E. cribrum* is "not confined to certain spots, but is generally distributed over a particular area"; some areas, however, where I have studied its range carefully, are so very restricted that they may well be called "spots."

As regards the variation in the imago, I can fully endorse Mr. Fowler's remark that his variety "5" is very scarce, for only one example of it has ever fallen to my lot. My collection, however, contains a still scarcer aberration of the male, taken near Ringwood in 1890, which is apparently unknown to him. The ground colour is white; the second and third black transverse "bands" are placed near together, and are both so exceptionally broad that the usual pale area between them is reduced to a narrow and much-interrupted white line, and they appear as a black central double fascia, which stands out very conspicuously against the white ground colour on either side of it. Among the hundreds of specimens that I have examined, I have never seen another example of this conspicuously black-banded form.

The Rectory, Corfe Castle:
January 30th, 1899.

THE EARLIER STAGES OF *LYCÆNA ARION*.

By F. W. Frohawk, M.B.O.U., F.E.S.

On July 22nd, 1895, my friend Mr. A. B. Farn very kindly sent me some ova of *Lycæna arion*, which he had just found deposited upon the flower-heads of wild thyme. The following interesting extract is from his letter received at the time:—"The ova deposited by females under perfectly natural conditions are laid singly (except in one case), and are inserted somewhat deeply among the clusters of buds of thyme. I could not discover any ova on thyme in full blossom, and it would seem that the buds are chosen so that the hatching of the larvæ and the opening of the buds should be contemporaneous."

Again, on July 9th, 1896, I received several more ova from Mr. Farn. These hatched on the following day. The ovum measures one-forty-eighth inch in width, and one-eightieth inch in height. It is of a very compressed globular form, sunken in the centre; so much so, that, to the naked eye, the operculum appears as a dark central spot. The entire surface is finely and beautifully reticulated by an irregular net-work pattern. The colour is pale bluish white.

July 13th, 1896. I placed the larvæ upon thyme blossoms, and found they soon began to feed. The next day I saw one eating into the base of the calyx, so that only the last few posterior segments of its body were exposed. On the 18th I noticed a few feeding, and a good deal of frass was adhering to the blossoms, which were more or less eaten, especially the petals.

July 22nd. Examined the flower-heads, and found only two larvæ; one in the second stage measuring one-twelfth inch long, and one in the third stage one-eighth inch long. The following is a description of the former. The first and last segments are flattened, projecting, and rounded, overlapping the head (which is withdrawn while at rest) and the anal claspers. The body is much arched, having a medio-dorsal ridge considerably elevated; the sides are flattened and sloping to a lateral ridge; the under-surface is also flattened; the ground colour is of a pearly-white, thickly studded with very minute blackish points; and scattered over the whole surface are a number of bristles, varying in length, all having bulbous dark shining brown bases; the longest are situated on the dorsal and lateral regions; the spiracles are shining dark brown; the segments are beautifully marked with purplish pink, forming longitudinal stripes, the most conspicuous being the medio-dorsal and lateral stripes; the three other stripes, two above and one below the spiracles, are made up of oblique markings. The head and prolegs are brown, and the claspers whitish.

A remarkable similarity exists between the buds of thyme blossom and the larvæ, both in the colouring and the pubescence of each, so much so that it requires very close examination to discern the little larvæ; and they generally conceal themselves inside the bloom, making detection all the more difficult; but generally a small hole is eaten through the calyx, when the larva may sometimes be seen with only the anal segments protruding.

The second larva, measuring one-eighth inch, being in the third stage, is similar in colouring, pattern, and structure, excepting that it is brighter, and the hairs a good deal longer, and the head is shining black.

Upon supplying them with fresh sprays of thyme, the larger of the two soon commenced feeding on the downy portion as well as the calyx of the bloom, which seems to be generally the first part to be eaten through, apparently to enable the larva to feed at once upon the base of the petals.

The largest larva moulted for the third time on July 26th. Twenty hours after moulting it still measures only one-eighth inch when fully extended. The general colouring is now more uniformly ochreous pink and duller; the second and third segments are humped; the first segment is sloping to the front, sunken in the middle, and rounded, overlapping the head, and it has a large black oval patch in the centre; the three posterior segments are also compressed and sunken; each segment is humped sub-dorsally, forming a deep longitudinal medio-dorsal furrow; the sides are concave, and the lateral ridge projecting and overlapping the entire length, hiding from view the legs and claspers; there are four longitudinal rows of long curved hairs, one row being sub-dorsal, and one lateral; each row is composed of a single hair on each segment from the fourth to the ninth inclusive, on which segment the sub-dorsal series terminates; the first three segments have each a set of three sub-dorsal hairs, those on the first segment curving forwards; the lateral series are likewise formed of one on each segment, and all directed laterally and surrounding the extremities of the larva; the hairs have the bases of remarkable formation, resembling glass-like pedestals with fluted sides. The entire upper surface of the body is densely studded with extremely minute pyriform glassy processes; the under surface is equally as densely clothed with very short stoutish hairs. The head is ochreous with dark brown markings in front; the prolegs dusky, and the claspers are unicolorous with the under surface.

In this stage (after the third moult) the larvæ persistently refuse to remain on the blossoms or any other part of the plant, and appear to have a tendency to hide in the ground. Although thyme and various other plants were supplied to them, they refused to feed, so, leaving them with a growing plant of thyme, and keeping them under conditions as natural as possible, trust-ing they would hybernate in that stage, I left them undisturbed; but subsequently nothing more was seen of them.

It will be seen from the above descriptions taken from my note-book (which corroborate Mr. Farn's note in the last number of the 'Entomologist,' p. 92) that the larva described by Mr. Nevinson does not at all correspond to the larvæ of *Lycæna arion* which I had under observation.

April 3rd, 1899.

ON NEW *SPILOSOMA* HYBRIDS.*

By A. v. Caradja.

Spilosoma mendica, L. hybr. *crassa*, Caradja (Pl. ix. f. 1–4). This form originated from a pairing between *S. mendica* hybr. *standfussi*, Car. ♂ and *S. sordida* ♀

The hybrid form *standfussi* I described in the 'Societas Entomologica,' 1894, p. 49: it originated from a cross-breeding of *S. mendica* female with male of var. *rustica*, Hüb. *Spilosoma mendica*, L., hybr. *viertli*, Caradja (Pl. ix. f. 5–11), which I dedicate to my friend Herr Hauptmann Adalbert Viertl, originated from a combination of *S. mendica*, var. *rustica* ♂ and *S. sordida* ♀

By crossing hybr. *standfussi* ♂ and *sordida* ♀ eight fruitful pairings were obtained; the contrary crossings of *S. sordida* ♂ and hybr. *standfussi* ♀, as well as of *S. sordida* ♂ and var. *rustica* ♀, were unfruitful.

Of the sixteen to seventeen thousand ova of the nine broods obtained, all acquired at the sixth day a darker colouring, a sure sign that they were fertilized; and this was further confirmed by a supplementary observation of the same ova previous to hatching, for in these the development of the tiny larvæ was more or less advanced.

From each of the nine broods, in about equal numbers, only 12–13 per cent. of the larvæ actually hatched out; a greater number had begun to bite through the egg-shell, so that the head-shield was already to be seen at the smaller opening, but most of the larvæ had not the strength to break through the egg-shell. Of the larvæ that hatched, about 25 per cent. did not touch the food at all, and died. The others proved themselves to be healthy, and developed normally up to the pupation later on. The larvæ grew up very irregularly, some requiring only forty-eight days, others seventy-two to seventy-six, the majority finding sixty days ample for their development from the egg to the pupa. I obtained altogether twelve healthy pupæ of the hybrid *crassa* and 114 of the hybrid *viertli*. To my regret, the

* 'Iris,' x. pp. 371–373, pl. ix. figs. 1–11. (Translated by G. W. Kirkaldy.)

majority of these pupæ perished through the awkward handling of my servant during my bimonthly absence; from the few rescued only two pairs of hybrid *crassa* resulted (those figured); as well as a few pairs of hybrid *viertli;* of the latter the four males and three females figured are the most diverse.

A description of these two hybrids will be unnecessary, on account of the illustrations, in which the patterns, black spots and stripes, are most accurately reproduced. Also the colouring, especially the more or less lighter grey of the males (the females are about as white as the females of *mendica*), stands out clearly in the illustrations. The darkest are the hybrid *crassa* males, which are dark grey on the anterior wings like some of the lighter *sordida* males, while their posterior wings are not so unicolorously dark, almost grey-black, but somewhat mixed with lighter grey. Of the hybrid *viertli* males, fig. 5 is the darkest, being about as dark as the male of *mendica* usually is, while the male portrayed in fig. 8 is the lightest, with yellow-grey anterior wings, which are about as light (but more yellowish) as the lightest examples of hybr. *standfussi.* The posterior wings of the male portrayed in fig. 7 are extraordinarily darkly striped.

I call attention here, further, to the fact that the ovaries of these hybrid females appear to be quite normally developed. One of these females I crossed with a male of the var. *rustica;* it laid 193 eggs, that is to say, as much (or as many) as was laid on an average by the *mendica* or *sordida* females. Each of these eggs produced a healthy larva, which, at the present time (middle of June), after precisely seventeen days, are already on the verge of the last skin-casting.

Upon the larvæ of these hybrids I noted the following:—Before the first skin-change, the larva (here in Rumania) of *mendica* var. *rustica* has a light yellow head-shield and light yellow fore feet; its body has a bright grey-greenish, almost translucent colouring. The *sordida* larva is much darker grey, and has a black head-shield and black fore feet. The hybrid larvæ occupy an intermediate position between the two; their body is light grey, their fore feet and the head-shield are reddish brown. After the first and second skin-changes, the colouring of the body becomes darker grey, that of the fore feet and head-shield brown; on the back and on the sides (always one) appear somewhat obliterated, brighter longitudinal lines, which are much more distinctly yellow-brown-bordered on the ninth segment.

After the third skin-change the hybrid larva (*crassa* as well as *viertli*) copy the larva of *sordida* accurately in the arrangement of the designs; they are, however, more brightly coloured. The dorsal stripes and the two lateral stripes are sharply marked, bordered with orange-yellow; the two last segments are reddish yellow; the head-shield and the fore feet are reddish, or chocolate brown.

After the last skin-change the hybrid larvæ acquire an altogether different dress from *sordida*, corresponding to the great mutual modifications. Many were fox-red-haired (like the larvæ of *mendica*); in the majority the hairs were dark brown or brown-gray; some were light gray. In all the light, yellow-bordered longitudinal stripes (dorsal and lateral) were as sharply marked as in *sordida*, the last segments were reddish yellow laterally; the two last marks appear to be characteristic of these hybrid larvæ.

In general, they do not occupy a position exactly in the middle between the progenitors, but much nearer to the larvæ of *sordida*, only some examples were nearer to those of *mendica* (var. *rustica*) than those of *sordida*.

A GUIDE TO THE STUDY OF BRITISH WATERBUGS (AQUATIC RHYNCHOTA).

By G. W. Kirkaldy.

Plate I.

(Continued from p. 8.)

Polymorphism.

The phenomenon of Polymorphism—or the occurrence, in the same species, of two or more different imaginal forms—obtains to a very large extent among certain Heteroptera, and is associated with the greatest alteration in structure in the semi-aquatic species. Although there are more noticeable differences in some exotics—*e.g.* the remarkable *Ptilomera laticaudata* (Hardwicke) and the still more extraordinary *Metrocoris stali* (Dohrn)—both from the Oriental Region,—nevertheless a very fair example is afforded by the British *Velia rivulorum* (Fabr.) = *currens* (Fabr.), a species well distributed over the British Isles. Plate i., fig. 1, represents the head, thorax, etc., of the ordinary apterous form; fig. 2, the same parts of the rarer macropterous form. In the former the pronotum is short (not completely concealing the mesonotum in the middle, and leaving the metanotum totally exposed), rather flat, gently rounded at the sides, the base slightly rounded. In the latter the pronotum is produced posteriorly over the mesonotum (which it conceals except near the postero-lateral angles) and a part of the metanotum, is irregularly angular laterally, and is somewhat convex. The powerful elytra and alæ require strong working and supporting muscles, which are contained inside the prothorax; when, however, the flight-organs are altogether absent, or present only vestigially, the thorax is much smaller and simpler, on account of the more or less rudimentary condition of the alar muscles. This distinction is even more remarkable in *Hebrus*, *Mesovelia*, and *Hydroëssa*, but not usually so marked, though sufficiently noticeable, in the British species of *Gerris*.

Not only may the same species be *dimorphic* (comprehending *macropterous* and *apterous* forms), but even *polymorphic*, through the occurrence also of brachypterous individuals;[*] in the last, the elytra may be only slightly shorter than the fully-winged form, and the alæ be present and functional, or the elytra may be represented merely by short pads, the alæ being absent, or there may be various intermediate degrees between these. In this respect, *Gerris lacustris* (Linn.) has provided me with more variations—at least six, from apterous to macropterous—than any other species.[†] It is noteworthy that in the brachypterous forms, the two abbreviated elytra are not always equal in length and development (in the same specimen).

It is not difficult to understand something of the causes that underlie this remarkable variety of structure.

The intermediate and posterior pairs of legs afford to the "surface-skaters" an ample means of progression on the streams and sheets of more or less still water which they frequent,[‡] and the absence of wings is (considering their environment) not only an advantage, but, I apprehend, necessarily ensues from the operation of Natural Selection in tending to weed out the macropterous and brachypterous forms.[§] Under certain circumstances, however, the results of Natural Selection will prove deleterious to the species, by producing only apterous individuals, so that local (perhaps even total) extermination of the species will ensue when the conditions of their habitat are altered for a sufficiently prolonged period of time. Upon large sheets of water, with many inlets and other places favourable to the flourishing of these species, winged forms will be superfluous, and will, in course of time, only appear rarely. In small wayside pools or streamlets which dry up periodically, it is obvious that the apterous inhabitants will die out unless their habitat is sufficiently near to a larger stream or pond; a severe drought occurring over a fairly large area, prolonged sufficiently to dry up all the water within that area, would cause all the species represented in that year by apterous individuals only to become extinct. Such cases will be familiar to those who have studied the aquatic Rhynchota-fauna of any locality for a consecutive number of years. Where, however, there are a few macropterous individuals, these will be able to emigrate to "pastures new" to found a fresh colony, which in course of time may, or may not, repeople the original habitat.

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[*] *μάκρος* (*măkros*), long; *βράχυς* (*brachus*), short; *ἀ* (*a*) privat.

[†] See Miall's 'Natural Hist. of Aquatic Insects,' fig. 103, No. 1, and fig. 104, No. 8, where a macropterous *Gerris thoracicus* and a brachypterous *G. lacustris* (?) are figured.

[‡] So far as my own observations go—and I am not aware of any published researches that tend to invalidate them—the *Hebridæ* and *Gerridæ* always escape from danger by the employment of their legs, never by flight, the wings being used only for migration.

[§] F. B. White was undoubtedly wrong in supposing that the apterous represent the primitive forms.

In confirmation of this, it may be noted that the occurrence in comparatively large numbers, or the apparently complete disappearance, of the macropterous individuals, does not seem to have any connection with the dryness or wetness of any particular year or years.

Aëpophilus bonnairii is, as one would expect, always (so far as yet known) brachypterous, practically apterous. Its habitat never dries up and its range along the sea-shore is to all intents limitless; thus migration is unnecessary, and the organs of flight have become reduced to their present vestigial condition.

Migration usually takes place during the night, and waterbugs (like other aquatic insects) are often misled by the reflection of the moon to mistake the glass roofs of conservatories and other similar buildings for the surface of still water. Electric light, or indeed any very strong light, proves a great attraction, causing (particularly at its first installation) a migration of certain water insects from outlying habitats to ponds near the light. This was especially remarked—owing chiefly to the great size of the objects—some years ago in Washington (U.S.A.), where specimens of the Giant Waterbugs (*Belostoma* and *Benacus*) were often found lying on the pavements of the city in the early morning.*

Mr. Malcolm Burr, while travelling last summer in Hungary, captured and forwarded to me a specimen of *Gerris thoracicus*, Schumm., which had alighted upon the dinner table, and Mr. E. E. Green has given me an example of a new bug (*Gerris tristan*, Kirk.) taken under similar circumstances in Ceylon.

MESOVELIA Mulsant & Rey,† is another genus of uncertain position, having been referred indifferently to the Hebridæ and to the Gerridæ. One species, *M. furcata*, M. R., is British and is usually apterous, being then a slender thin-legged green creature, readily distinguished—with *Hebrus*—from the other semi-aquatic genera by the possession of two ocelli. The coxæ are practically contiguous, and the mesonotum is not concealed by the pronotum. The thoracic structure in the winged forms is

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* 'Proc. Ent. Soc. Wash.' iii. pp. 87–8. See also Fletcher, 1884, in 'Entom.' xvii. p. 21.

† μεσός (*mĕsos*) middle, and "*velia*"; of the latter I do not know the derivation—possibly from French *velours* (velvet), in allusion to the pubescent under-surface of the body; or, more probably, from the Latin *velum*, a sail: *e.g.*, *vela dare*, to set sail, as an appropriate name for a waterbug.

remarkable. According to Douglas and Scott, the mesonotum comprehends the two basally-rounded plates posterior to the pronotum, but this view has not apparently been confirmed by other authors. In my own collection I possess apterous forms only, and have examined but a single macropterous individual (of the specific identity of which I am not certain), so that I cannot add anything as yet to our knowledge of this genus. Detailed descriptions will be found in the 'Ent. Mo. Mag.,' iv., 1867, p. 5, Plate i., fig. 1 (brachypterous), and in Saunders's 'Heteroptera,' p. 146 (brachypterous form figured in the large edition, Plate xiii., fig. 7). The apterous form, which has not to my knowledge been previously delineated, appears on Plate i., fig. 6, where the ♂ is figured; the ♀ is a little broader, and differs in the structure of the genital segments. *Mesovelia furcata* has been recorded from Burton-on-Trent, Woking Canal, and near Windsor. I have twice searched for it at Woking, but without success; this may be due to the fact that the canal has been cleaned out somewhat frequently of late years.

Some interesting observations by E. A. Butler were published in the 'Ent. Mo. Mag.,' 1893, xxix., pp. 232–6. The insects were found on a pond near Windsor, on the leaves of *Potamogeton natans*, from which, however, they were with difficulty distinguished. They are carnivorous, according to Butler, feeding upon *Smynthurus* and other small insects.

HYDROMETRA* (= *Limnobates*) is yet another genus of doubtful position, containing one species—*H. stagnorum* (Linn.), upon which the following specific names have also been inflicted at various times, viz.: *acus*, *alata*, *angusta*, *angustata*, *lineola*, and *pallipes*! As it cannot be mistaken for any other British waterbug, it will not be necessary to linger here upon its structural peculiarities. It is described and figured in Douglas and Scott (Plate xix., fig. 7), in Saunders, and also in Miall (fig. 102), and is, moreover, beautifully figured in Curtis's 'British Entomology.' Mr. Saunders has kindly called my attention to a mistake in a former part of this "Guide" (Entom., 1899, p. 6), where I wrote: "in all the aquatic forms . . . . the anterior legs are raptorial. In all the femora are dilated." The present genus had escaped my memory, as, of course, the anterior legs are very slender and very similar to the other two pairs. Although doubtless they are employed for holding the food during feeding, they cannot be said to be noticeably modified for raptorial purposes. *Hydrometra* is a very timid bug, keeping close to the banks of the stream or ditch which it frequents, and moves with a slow, careful, almost pensive tread, very distinct from the jerky sprawl of *Gerris*; it is moreover not so gregarious as are most of the other semi-aquatic species.

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* ὕδωϱ (*hūdōr*), water; μετϱόν (*mĕtron*), measure.

Two brief papers* have been published by Arrow and Palumba upon the habits, etc., of the species before us.

Arrow has observed that some ova hatched in three weeks (May 25th), the first nymph maturing June 27th. The young nymphs live on *terra firma*, occasionally making excursions on to the water, but keeping near the edge. Until almost full-grown, their food consists of the Black Water Springtail (*Smynthurus niger*), which seems to form the staple nourishment of most small aquatic insects.

H. stagnorum seems well distributed in England, and has been recorded from Moray and Perthshire, in Scotland, and from Armagh in Ireland. The head is figured on Plate i., fig. 10, and the right anterior tarsus on fig. 5.

The semi-aquatic forms which, up to the present, we have considered—viz. *Hebrus*, *Aëpophilus*, *Mesovelia*, and *Hydrometra*—form a very heterogeneous group; they have, however, several features in common, which they do not share with the succeeding genera, viz.: *Velia*, *Hydroëssa*, and *Gerris*. The former move opposite legs alternately, in the act of progression; the latter move them together. The claws are inserted at the apex of each tarsus in the former, considerably below the apex in the latter. (Plate i., figs. 4 and 5.) The constituents of the former group are but little related to one another and perhaps still less to the latter group, but with the scanty knowledge we possess at present of their metamorphoses, habits, and anatomy, it seems useless speculating upon their affinities, and convenient to place them all in one family, Gerridæ (= *Hydrometridæ* auctt. + *Hebridæ* auctt.).

The following table will readily separate them:—

1. Claws inserted at the apex of each tarsus (fig. 5); opposite legs moved alternately in progression	2
— Claws inserted below the apex of each tarsus (fig. 4); opposite legs moved together in progression	5
2. Coxæ practically contiguous	4
— Coxæ widely separated	3
3. Antennæ with five distinct segments; head short, ocelli present; tarsi with two segments. Found in *Lemna*, *Sphagnum*, etc.	... *Hebrus.*
— Antennæ with four segments; head very elongate (figs. 10 and 5), ocelli absent; tarsi with three segments. Found near the edges of ditches and streams...	...*Hydrometra.*

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* Arrow, "*Habits of Hydrometra stagnarum*," (*sic*), 'Science Gossip,' 1895, ii. pp. 201-3. Palumba, "*Gli amori del l' Hydrometra stagnorum*," 'Rivist. Ital. Sc. Nat.' 1891, xi. p. 1. There is, apparently, also some information anent the habits, etc., in Griffini's 'Gli Insetti Acquaioli' (Turin) 1894, which I have not seen.

4. Ocelli absent; antennæ long and thick. Marine. Found under stones, etc., below high-water mark ... ... *Aëpophilus.*
— Ocelli present; antennæ long and slender. Fresh-water. Found on *Potamogeton*, etc., in ponds and canals (fig. 6) ... ... *Mesovelia.*
5. Prosternum, mesosternum, and metasternum more or less equal to one another, all well developed (fig. 3); posterior femora not reaching apex of abdomen 6
— Prosternum and metasternum very short, mesosternum generally much longer than the other two sterna together (fig. 11); posterior femora reaching far beyond apex of abdomen ... ... *Gerris.*
6. Elongate; first segment of antennæ long, curved; anterior tarsi with three distinct segments (fig. 4) ... ... *Velia.*
— Short; first segment of antennæ short; anterior tarsi with one segment and two minute "nodes" between the tarsal segment and the tibia ... ... *Hydroëssa.*

HYDROËSSA Burm. 1835 (= *Microvelia* Am. & Serv. 1843)* bears a striking though superficial resemblance to *Hebrus*. There is only one British species, viz. *H. pygmaea* (Dufour), figured in the British works above-mentioned. It has also been described under the names *reticulata* and *pusilla*. The apical segments of the venter (♂ and ♀) are figured here on Plate I., figs. 12 & 13.

It is gregarious and widely distributed from Perth to Hampshire and from Norfolk to Armagh, though it can scarcely be considered common. The macropterous form is rare. I found a small colony in a large reed-fringed pond in Woolmer Forest (Hampshire) on Easter Monday last, and observed them for a little over half an hour in their natural habitat. Unfortunately, I was not able to stay longer (having to return from a short holiday), but I captured a few individuals to continue my observations upon them—and they are now before me.

They were assembled in a small inlet fringed exteriorly with reeds, a luxuriant mass of *Sphagnum* concealing the margin of the pond. In the water were masses of *Ceratophyllum demersum* (hornwort). The tiny blackish insects, specked with pale bluish, are very conspicuous in the water; they disdain any foreign support as they move about—so lightly that there is scarcely even the slightest dimple impressed on the surface. Their gait may be described best as a "scuttle," a series of very quick, short steps, the femora being almost horizontal. They move very rapidly, but rarely sustain the effort long—the opposite legs are moved alternately (see p. 112). They seem, however, to have very feeble adherent powers; if placed on a piece of paper or bit of rough cork and allowed to run about, they always tumble off immediately when the cork or paper is gently inverted, and they are apparently unable to mount a perpendicular glass surface. The macropterous form is rather smaller than the apterous, and moves with a somewhat greater rapidity.

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* *Microvelia* was founded by Westwood in 1834 (Ann. Soc. Ent. France), as a section or subgenus only; he refers to the species as "*Velia pygmaea*" or "*Velia* (*Microvelia*) *pygmaea*" throughout.

The condition of the pubescence with which these insects are clothed, and of the various longer hairs on the legs, antennæ, &c., their smoothness and their freedom from all kinds of extraneous matter, are of prime necessity, and consequently a very large portion of their energies is directed to that end. The cleansing is performed entirely by means of the legs, and may be described as a "dry-wash." The antennæ receive especial attention—these are clothed with short, fine hairs, directed forwards from their base; the *Hydroëssa* deals with each separately, bringing its anterior legs together, almost touching at the apices of the *femora*. The antennæ are thus loosely held in position, while the tarsi are employed to smooth forward any disarranged hairs into their natural position. I have not observed any special cleaning structure, such as that which obtains in certain Hymenoptera, &c. During this, the insect is distinctly raised up in front by means of the intermediate legs.

One of the individuals I am observing has lost the apical two segments of the left antennæ, and, although this seems to have no absolutely deleterious effect upon the bug, it is evidently causing her a great amount of anxiety. She appears to be much perplexed at the shortness of the antenna, and repeatedly strokes it between the two anterior legs; there does not, however, seem to be any actual pain connected with the loss. The antennæ are probably auditory organs—certainly not tactile—as directly the bug approaches an obstruction, the antennæ are thrown back out of harm's way, almost at right-angles to the longitudinal plane of the body. It may be noted that the eyes are enormously developed in this genus and its allies.

The legs are cleaned in much the same manner as the antennæ. The pubescence on the head is smoothed by the tarsi of the *posterior* legs (one at a time), the latter being very long and flexibly-segmented. The attitude of *H. pygmaea* during this part of its toilet is very funny, reminding one irresistibly of a dog scratching his ear. The posterior tarsi are also brought into play for the cleansing of the connexival (and abdominal) pubescence. In the macropterous individuals, the flight-organs are slightly lifted up, the posterior legs (one at a time) moving underneath them, arranging the pubescence.

Attention to the ventral parts of the body is a rather more delicate matter. The body is tilted up on one side by means of the anterior pairs of legs and one posterior leg; the other posterior leg (that on the uptilted side) performing the work.

Hydroëssa does not, I think, move very far out from the water's edge, and scuttles in under the shelter of the bank upon being disturbed.

One specimen (macropterous) appeared to have been drowned; —on removing it from the water it remained perfectly motionless. I then placed it upon its back for the purpose of examining the ventral surface; after a few moments, first one of the legs, and then another—finally five and one antenna—began to pulsate feebly but rhythmically. The bug appeared to be quite dead, but the pulsations nevertheless accelerated (unequally in the different legs) and increased in vigour. Upon tapping the support, the movements ceased, but recommenced after a short interval. Unfortunately, an accident prevented more extended observations. These pulsations are well known to occur in the Rhynchota,* and are quite distinct from the ordinary muscular movements.

Explanations of Plate I.

FIG.

1. *Velia rivulorum* (Fabr.); head, pronotum, &c., of apterous form.
2. Head, &c., of macropterous form of same species.
3. Sterna of same species.
4. Anterior tarsus, same species.
5. ,, ,, *Hydrometra stagnorum* (Linn.).
6. *Mesovelia furcata* Muls. & Rey, ♂, apterous form (dorsal view).
7. Antenna of *Gerris najas* (De Geer), Kirk.
8. ,, *G. rufoscutellatus*, Latr.
9. ,, *G. lacustris* (Linn.), Stål.
10. Head and antenna (dorsal view) of *Hydrometra stagnorum* (Linn.).
11. Sterna of *Gerris najas* (De Geer), Kirk.
12. Apical segments of abdomen (ventral view) of *Hydroëssa pygmaea* (Duf.) ♂.
13. Apical segments of abdomen (ventral view) of *Hydroëssa pygmaea* (Duf.) ♀.
14. Apical segments of abdomen (ventral view) of *Velia rivulorum* (Fabr.) ♂.

a. pronotum, *b*. mesonotum, *c*. metanotum, *d*. first segment of abdomen, *e*. prosternum, *f*. mesosternum, *g*. metasternum.

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* See W. A. Locy—"Observations on the pulsating organs in the legs of certain Hemiptera"—(Amer. Nat., 1884, pp. 13–9, Plate i.).

(To be continued.)

DESCRIPTIONS OF NEW SPECIES OF SYNTOMIDÆ IN THE COLLECTION OF MR. H. J. ADAMS, F.E.S.

By Percy I. Lathy.

Syntomis sulana, sp. nov.

♂. Blackish with a purple gloss; antennæ whitish towards tips; thorax with lateral crimson patches; abdomen with only faint indication of crimson on basal segment; complete crimson bands on next three segments; terminal segments with bands incomplete dorsally. Fore wing with long wedge-shaped hyaline patch in end of cell; a larger oblong patch below cell; an oblong patch above vein 6, and two patches between veins 3 and 5. Hind wing with two small elliptical hyaline spots below cell, and divided by vein 2.

Hab. Sulla Mangola (type); Sulla Besi.

This species may be distinguished from *S. celebesa*, Walk., by the two hyaline spots of the hind wing, and from ab. *gracilis*, Röber, by the abdominal bands being incomplete dorsally.

Sarosa xanthotarsis, sp. nov.

♂. Head and thorax black; frons and thorax with patches of olive yellow; thorax at side and legs with patches of metallic blue; minute metallic blue points on tegulæ; tarsi completely orange; abdomen black, with olive yellow patch on first segment and narrow bands on the others; dorsal and sublateral series of metallic blue spots, and one or two metallic blue spots on ventral surface; wings yellowish hyaline, the veins and margins black. Fore wing with minute metallic blue basal spot just below costa; the inner area orange; veins orange towards base; the terminal band very wide on apical area, and expanding slightly at tornus. Hind wing with the terminal band expanding between vein 2 and tornus.

Hab. Venezuela.

Closely allied to *S. sesiiformis*, Walk., but may easily be distinguished by the completely orange tarsi and orange inner area of fore wing.

Cosmosoma rubrobasalis, sp. nov.

♂. Head black, with metallic blue on frons and vertex; antennæ white at tips; tegulæ black, with metallic blue points; thorax scarlet, the patagia rather widely fringed with blue-black; fore and mid-legs blackish brown marked with scarlet; hind-legs scarlet marked with black; abdomen black with a series of large subdorsal scarlet patches except on last two segments, leaving dorsal and lateral triangular black patches containing metallic blue spots; ventral valve white; wings hyaline, the veins and margins black. Fore wing with the base scarlet, extending slightly along costa and inner margin; discocellulars with rather more black than other veins; terminal band very wide on apical area, and expanding at tornus. Hind wing with terminal band expanding at apex and tornus.

Hab. Ecuador, Angamarca.

Very near *C. sectinota*, Hamps., but may be distinguished by scarlet basal marking of fore wing.

Cosmosoma pellucida, sp. nov.

♀. Head, thorax, and abdomen black; frons white; tegulæ, patagia, and thorax with patches of metallic blue; fore coxæ white in front; legs streaked with blue; abdomen with sublateral red stripe extending along first five segments; ventral surface white excepting last two segments; wings hyaline with veins black, and margins broadly black. Fore wing with terminal band very wide on apical area, and expanding considerably at tornus; inner margin heavily bordered, especially near base; a hyaline streak between costal vein and costa; a large discocellular patch. Hind wing hyaline, with terminal band very wide on apical area, and expanding at tornus. Under side of fore wing with short metallic blue streak on costal vein, and metallic blue patch in and above basal part of cell of hind wing below.

Hab. Brazil.

This species bears a superficial resemblance to *Pheia sperans*, Walk.; but the hind wing has vein 3, which is given off from 4 just before margin.

Euchromia cœlipunctata, sp. nov.

♂. Black; frons white; white patches on coxæ; abdomen with crimson dorsal patch on first segment; a lateral crimson spot on second segment, and ventral and lateral crimson bands on next three segments. Fore wing with a minute metallic blue spot at base near costa, and small blue spot on discocellulars; a small hyaline spot below base of cell; a spot in cell, and patch below it; a spot above vein 6, and two spots between veins 3 and 5. Hind wing with hyaline patches in and below cell and on inner area; an oblique macular band beyond cell between veins 2 and 6; a small blue patch on discocellulars.

Hab. Bouru.

This species resembles *E. bourica*, Boisd., *E. amboinica*, Hamps., and *E. dubia*, Röber, in the crimson bands being incomplete dorsally; it differs, however, from each of these species in having a dorsal crimson patch on first segment, and no abdominal blue bands.

Euchromia fulgens, sp. nov.

♂. Black; neck, patagia, tegulæ, and thorax with patches of metallic blue; frons and patches on coxæ white; abdomen with orange dorsal patch on first segment, and brilliant metallic blue-green bands on remaining segments; ventral and lateral crimson bands on third, fourth, and fifth segments. Fore wing brilliant blue at base, and extending along veins beyond first hyaline spot; a brilliant blue patch on discocellulars; hyaline spots below base of, and in and below cell; a spot above vein 6, and two spots between veins 3 and 5. Hind wing with hyaline patches in and below cell, and on inner area; a wide oblique macular band beyond cell, between veins 2 and 7; a brilliant blue spot on discocellulars.

Hab. Masor Island, Geelvink Bay.

Allied to *E. dubia*, Röber, but may be distinguished by all the segments after the first having dorsal blue bands.

Trichura fulvicaudata, sp. nov.

♂. Black; frons, vertex of head, tegulæ, patagia, thorax, and coxæ with patches of metallic green; palpi in front, fore coxæ, mid and hind trochanters orange yellow; abdomen with dorsal and lateral series of metallic green spots; ventral surface of two basal segments orange yellow, and sublateral orange yellow patches on third; anal appendage bright fulvous towards extremity; wings hyaline, with veins and margins black. Fore wing hyaline yellow; a basal orange spot below median vein; a discoidal black bar; terminal band expanding slightly towards apex, and below vein 2. Hind wing hyaline blue, with apical black patch and inner area black.

Hab. Paraguay.

May at once be distinguished from any other species of *Trichura* by the fulvous extremity of anal appendage.

Metastatia azurea, sp. nov.

♂. Black; palpi in front, sides of frons, head behind eyes, and a spot on vertex, coxæ and streaks on femora greyish white; abdomen shot with brilliant blue; dorsal and lateral bluish grey lines; anal segment and tufts crimson; ventral surface greyish white; wings shot with brilliant blue. Fore wings with wedge-shaped hyaline patches in and below cell and between veins 2 and 3; a slightly curved oblique band beyond cell extending from just below costa to vein 3 near tornus. Hind wing hyaline, with veins, upper part of cell and rather wide terminal band black, shot with brilliant blue.

Hab. Ecuador, Angamarca.

May be separated from *M. pyrrhorhœa*, Hübn., by greater extent of hyaline markings, the black more brilliantly shot with blue, and crimson anal segment.

Eriphioides viridis, sp. nov.

♂. Black-brown; vertex of head, neck, tegulæ, patagia, thorax and legs with patches of metallic green; fore coxæ and palpi with white spots; abdomen shot with cupreous green; a sublateral series of white patches on each segment, becoming smaller towards anus. Fore wing with basal half brilliant cupreous green; below with inner area covered by lobe of hind wing whitish; a metallic green patch in and about cell. Hind wing with costal half whitish; below with basal costal region metallic green.

Hab. Ecuador.

May be distinguished from other species of the genus by having sublateral white markings on each segment, and brilliant green basal area of fore wing.

Eriphioides albipunctata, sp. nov.

♂. Black; white spots on tegulæ, shoulders and thorax above; antennæ blue-black; fore and hind coxæ white; abdomen shot with metallic green; a large lateral white spot on first segment, and sublateral white patches on first five segments. Fore wing shot with metallic green along costa and submedian interspace; a small hyaline spot towards lower end of cell, another below it, and a third between veins 3 and 4; below with inner area covered by lobe of hind wing whitish; apical area shot with metallic blue-green. Hind wing with costal half brownish white, and basal part of inner margin white; below with costal half metallic blue-green; inner area white.

Hab. Ecuador, Balsapamba (type); Angamarca.

The hyaline spots of the fore wing at once serve to distinguish this species; in the specimen from Angamarca the hyaline spot between veins 3 and 4 is wanting.

Antichloris purpurea, sp. nov.

♂. Black; vertex of head, thorax, patagia, shoulders and legs with patches of metallic green; a few crimson hairs about neck; fore coxæ white; abdomen cupreous green; dorsal white patches on first two segments, and large lateral white spot on first segment; ventral surface of first four segments white. Fore wing shot with rich purple at base, becoming greenish towards termen; below with inner area covered by lobe of hind wing, and streak along costa brownish white; apical area shot with blue-green. Hind wing shot with blue-green; costal half brownish white; below shot with blue-green, especially costal half.

Hab. Ecuador.

May be distinguished from *A. scudderi*, Butl., by dorsal white patches.

Coreura adamsi, sp. nov.

♀. Black; palpi crimson in front, excepting terminal joint; a few red hairs about neck; legs striped with metallic blue; abdomen metallic blue. Fore wing with oblique crimson fascia beyond cell, extending from subcostal vein to near tornus; this fascia is narrower at tornus, and has a slight suffusion of orange scales; cilia at apex white; below shot with metallic blue, especially in upper part of cell and submedian interspace, to crimson fascia, which is much wider. Hind wing shot with brilliant blue, especially at base and along inner area; cilia crimson; below scarcely shot with blue; a narrow, irregular, terminal crimson band.

Hab. Ecuador, Banos.

Allied to *C. lysimachides*, Druce, but may be separated by absence of terminal crimson band of upper side of hind wing.

Neacerea elegans, sp. nov.

♂. Black-brown; front of palpi, sides of frons, minute spots at base of antennæ, and fore coxæ white; legs streaked with white; neck crimson; abdomen with dorsal metallic blue patches on first and anal segments, and dorsal metallic blue points on remainder; ventral surface white. Fore wing with large quadrate hyaline patch in end of cell; two hyaline patches between veins 3 and 5; cilia and margin at apex white; below with basal part of cell and submedian interspace brilliant metallic blue. Hind wing with narrow elongated hyaline patch in cell, a large patch below, and another narrow one on inner margin; a wedge-shaped patch at base of vein 2; below with hyaline markings bordered with brilliant metallic blue, widely on costa, and at tornus.

Hab. Ecuador, Banos.

This species is very distinct from any other in the genus, owing to the beautiful metallic blue markings of the under side.

Neacerea suffusa, sp. nov.

♂. Dark brown; back of head with paired crimson spots; patches on coxæ crimson; abdomen with series of subdorsal metallic blue-green patches. Fore wing with small quadrate hyaline patch toward end of cell, a wedge-shaped patch below cell, a patch between veins 2 and 3, and two patches between veins 5 and 7 just beyond cell; between veins 2 and 5 are three elongated semihyaline patches. Hind wing hyaline, with veins and margins black, the black expanding widely at apical area and just before tornus.

Hab. Demerara.

Allied to *N. dizona*, Druce, but may be distinguished by the crimson patches on coxæ, subdorsal metallic blue-green patches, and dark brown ventral surface.

Eucereon ruficollis, sp. nov.

♂. Head and thorax greyish, marked with fuscous; back of head with two orange patches; neck crimson; tegulæ with fuscous spots, and patagia edged with fuscous; fore coxæ pink; abdomen crimson, with lateral series of black spots, and extremity black; ventral surface dull orange-yellow; anal tuft greyish yellow. Fore wing grey; a curved series of four fuscous spots near base; just beyond this a series of five spots, and again beyond this a series of four spots; in this latter series the upper spot, which is in the cell, is nearer the base than the other three which run obliquely from near base of vein 2 to inner margin; an irregular wide fuscous band crossing wing, the inner edge of this band being within cell; beyond this and not far from apex a rather wide macular band extending from costa to vein 5, and two spots below it between veins 3 and 5; a marginal series of six spots; cilia spotted with fuscous. Hind wing semihyaline strongly suffused with fuscous, especially at apex.

Hab. Venezuela.

Near to *E. balium*, Hamps., but may be distinguished by crimson neck, and ventral orange surface of abdomen.

Eucereon inconspicuum, sp. nov.

♂. Head and thorax greyish; neck and coxæ orange-yellow; tegulæ fuscous; abdomen orange, with last two segments and ventral surface of last four segments black. Fore wing greyish; a large fuscous spot on costa near base; an irregular fuscous patch in cell; costa above terminal half of cell fuscous; an irregular curved line from base of vein 2 to inner margin not far from base, from this line another just above vein 1 towards base, but branching into a Y long before it; beyond cell a curved irregular band crossing wing, terminating on inner margin near tornus; a large patch on costa not far from apex extending to vein 5; a series of small elongated marginal patches. Hind wing fuscous, approaching semihyaline in and about cell.

Hab. Demerara.

Appears to be nearest *E. aoris*, Möschl., but in that species the terminal segment only is black, and the ventral surface is white.

Lynton Villa, Sydney Road, Enfield.

MORPHO CACICA, Staudinger.

This beautiful species has been regarded by many collectors as only a variety or local form of *rhetenor*, Cramer. I have, however, recently received some specimens from Peru, and amongst them a very fine female, which, compared with that of *rhetenor*, exhibits some very striking differences, leading to the inference that the species are distinct.

The main points are that the anterior wings of *cacica* are a very light fulvous, the cell black to near the apex, where there is a distinct fulvous spot quite absent in *rhetenor*, and in the latter species the basal dark fulvous is suffused over the remainder of the wing, whereas in *cacica* it stops sharp short at the cell. A further pronounced difference is in the hind marginal band, which in *rhetenor* is almost entirely black, with very small spots; that in *cacica* has large fulvous wedge-shaped markings throughout the band on both wings. A further point is that this band in the posterior wings of *rhetenor* extends right to the outer edge; whereas in *cacica* it is well cut off by a wide fulvous line, intercepted in the centre by a narrow black one. Generally the two species can be at once distinguished by the very much darker colouring in *rhetenor*.

The males received are all uniformly much larger than the largest *rhetenor* examined, and all have the conspicuous submarginal and costal white wedge-shaped markings.

The sexes being therefore differently marked to their congener, I think that Dr. Staudinger's name is a sound specific one.

The specimen has been added to the museum of Mr. H. J. Adams, of Enfield.

William Watkins.

Eastbourne: March 30th, 1899.

ON THE LARVÆ OF CERTAIN BRITISH MOTHS.

By J. Arkle.

Tephrosia crepuscularia (*bistortata*) = *T. biundularia.*—A scarce form of the larva of this species is inky-black, except in the ever-present pale (in this case whitish) blotch above and upon the claspers of segment 10. I put six of these in a pot by themselves, to see if the resultant moths turned out to be the black variety of the imago (Entom. xxxi. 27). These larvæ unfortunately failed to produce moths.

Hybernia marginaria (*progemmaria*) var. *fuscata.* — "The larvæ are nearly full-grown. They vary in colour very much—perhaps most are an ochreous-hazel, with a series of paler dashes of that tint along each side, and a dorsal configuration or stripe of diamond pattern stretching centrally along the back; others are a reddish purple and unicolorous, without pattern; others are sooty black, unicolorous, and without pattern. Finally, there are intermediate colour forms of larvæ between these types" (Note-book, June 16th, 1897). These larvæ were pure descendants of moths dating 1895. Some of the imagines of 1897 showed a disposition to revert to the type (*marginaria*). About half of those for 1898, whether from black larvæ or not, were midway in colour between the variety (*fuscata*) and the type—the rest were true *fuscata*—all of which does not increase my faith in the evolution of species. I have observed a still more rapid and complete reversion to the typical insect, that is, in the space of a year, in the following varietal forms,—*olivacea* back to *Polia chi*, and *gothicina* to *Tæniocampa gothica.* I am very curious to know if *doubledayaria* behaves similarly in reverting to the typical *Amphidasys betularia*—both parents, of course, to be true *doubledayaria.*

Asteroscopus nubeculosa.—A few eggs from Rannoch moths hatched on April 25th, 1897. The larvæ should be sleeved out, as the species is difficult to rear; but I decided to try them (1) *after hatching* in a glass tumbler with muslin over the top fastened by an elastic band, a piece of glass nearly covering the muslin so as to allow for ventilation, whilst preventing the food (birch) from withering; (2) *afterwards,* a well-ventilated cage with the twig of food in a little water; (3) *lastly,* a good-sized flower-pot three parts full of soil, with net over the top, food-plant and other arrangements as in (1). The young larvæ, ten all told, nearly all died off under the treatment marked (2). The disease was diarrhœa, owing, I believe, from past observations, to the food having to be placed in water. My survivors were three. One met an accidental death, and the remaining two pupated June 30th in the soil of the flower-pot. The first moth emerged March 18th, 1898, but the wings failed to fully develop. The second appeared March 28th, 1899, having been two winters in pupa, a peculiarity often occurring, and just as partially, with many of our spring moths, regardless of out-door temperature, as *Endromis versicolor*, *Saturnia carpini*, *Asphalia flavicornis*, *Nyssia zonaria*, and *Tephrosia crepuscularia* (*bistortata*) = *T. biundularia*. The following description, from my note-book, of the larva of *A. nubeculosa*, just before pupation, may be interesting:—"Head pale green. Body apple-green; a dorsal line of white-yellow spots from 4th to 12th segment. Segments, beginning with the 3rd, spotted dorsally with pale yellow; an oblique primrose-yellow mark on each side of the 4th segment, a similar mark above each anal clasper, and one also straight across from side to side on the 12th segment. Spiracles white with black rings. Legs reddish brown; claspers apple-green, each with a faint black circular mark."

Agrotis ashworthii.—Another difficult species. Fifty-three eggs began to hatch on July 22nd, 1897. They are spherical, dull whitish after a few days, being first white. They are closely ribbed. There is an apical irregularly-shaped blotch of reddish brown, and an irregular blotched and sometimes interrupted ring of the same colour round the widest part of the egg. All had hatched by the 25th. Treatment as in *A. nubeculosa*, (1) and (2). Food, dandelion; but I find the broad-leaved plantain best when the larvæ are well grown. On hatching the larvæ are pale brown, with a slight scattering of black short hairs. On the 25th those first hatched had changed to dull green. They looped like geometers. Up to this period they are semi-transparent, with a brownish head. The 2nd segment is unmarked; the 3rd is bounded by two rings of closely-arranged black spots dividing the segment from the 2nd and 4th. After the 3rd each segment has, dorsally, four black spots, two near the front and two near the rear, the rear couple being farther away from each other than the two in front. When making this observation (through a strong lens) the larvæ raced up to the edge of the tumbler. One got outside and quickly dropped, using the thread of silk from its mouth common to so many caterpillars. A strong breeze did the rest, and I lost it.

July 30th.—About half the number of larvæ reached the second stage. Head pale brown, with a distinct pink shade. Dorsal surface dull pale green, but darker towards the sides; a paler indistinct median line, and a similar line on each side of it. A pale whitish green subdorsal stripe along the middle of each side, then a dull pale green under surface. Legs and claspers correspond with colour of dorsal surface. The black spots are smaller in comparison to the increased size of the caterpillar.

Aug. 10th.—Third stage reached by about a third. Head pale brown. Dorsal area pea-green, smoky green, or dull green.

Segments 5, 6, 7 often with yellowish divisions. Under surface, legs, and claspers pea-green; along each side is a broad silvery white stripe. Immediately above this stripe the dorsal surface is black, but tones off rapidly into the pea-green, smoky, or dull green. On each segment, dorsally, except the 12th and 13th, are two outward-bent, wedge-shaped, black marks pointing in the direction of the head. These marks are longest on segments 10 and 11; on the others they stretch along half the length of each segment, except on segment 2, where they are usually small and indistinct. The caterpillar is smooth and cylindrical.

I may as well continue my notes on these caterpillars:—

Aug. 13th.—They are not eating so much. They remain motionless for long periods, which looks as if they are nearing hybernation. 20th.—A few have entered the fourth stage. The green of the caterpillars is now very dark olive—in fact, blackish. The broad silvery white stripe remains, but the dorsal, wedge-shaped, bent, jet-black marks are larger and more distinct. In other respects the larvæ resemble those in the third stage. 26th.—A small one, in its second skin, died. A few laggards are still in the second stage, and some in the third. 28th.—Two, in the third stage, died. The diseases are the same which carry off so many of the wild full-grown larvæ when confined, *viz.* diarrhœa and constipation. 30th.—Another small one died.

Sept. 1st.—Another died (third stage), making the fifth death. Removed the rest into an airy breeding-cage with moss at the bottom. They now eat little, and appear about to hybernate. The larger ones, which are about half the total number, have now reddish heads, and are very like what we get in spring; they are smaller, dusky olive-green, but, although they have the two black wedge-shaped dorsal marks on each segment, they still retain the mid-side stripe of white. This is still the fourth stage. 30th.—Two imagines of *Orthosia lota* emerged. The larvæ were found when feeding *A. ashworthii* larvæ, in spring, on sallow-catkins. The two caterpillars of *O. lota* were then almost microscopic, and were feeding inside the catkins.

Oct. 9th.—Only nine larvæ of *A. ashworthii* seen in the cage. 17th.—Five larvæ only seen, but they appear to be doing fairly well; they prefer dandelion. 31st.—Fine and warm, but only four poor-looking larvæ appeared at night; none by day.

Nov. 4th.—Saw eight in the cage to-night. 11th.—All the larvæ seem to have retired for the winter. 28th.—Two healthy-looking *ashworthii* larvæ in the cage, at night only, on dandelion and grass-leaves. I have often seen the caterpillars eat grass, but sparingly.

Dec. 1st.—Totally disappeared. 11th.—If living they are hidden under the moss in their cage. We have had no frosts yet, although it has often been very cold.

Jan. 22nd, 1898.—Turned out the contents of the cage, and found all the *ashworthii* larvæ dead, dry, and shrivelled up.

The following description, from my note-book, may also be of interest. It represents the caterpillar in the final stage, and just before pupation in the soil, between the middle and end of May. Although I have sometimes noticed spring-collected larvæ change their skins once, still the description will stand good for all collected for me after natural hybernation:—"Head shining, reddish russet. Upper and under side of body dark slate-colour, sometimes with a greenish tinge. Legs dull red. Spiracles cream-colour, with reddish tint. On the back of each segment are two large, velvety black, outward-bent, wedge-shaped marks. When the segment is extended in crawling, these marks are seen to stretch down, or along, half the dorsal length of each segment; their outer boundaries describe a right angle, the inner boundary is a curved outward-bent line. On the 2nd segment there are no marks. On the 4th, at the points of the wedge-shaped velvety black marks, are two well-defined but irregular spots of the same velvet-black. The wedge-shaped marks become gradually broader towards the 12th segment (inclusive), but on the 13th or anal segment they are narrower and leaf-shaped." The moth appears about the end of June

Callimorpha hera—On Oct. 9th, 1897, I had two dozen young larvæ. The great point was to get them through the coming winter, so I planted some ground-ivy and dandelion in a large flower-pot. I then bent over crosswise a couple of willows, covering all with gauze, which I fastened to the pot with string. The ground-ivy ultimately died under the gauze, but the dandelion kept up a few green leaves to the last. Hybernation with this species seems to be intermittent. My caterpillars thinned off mysteriously. On Jan. 1st, 1898, the survivors wakened up, but I was able to count only thirteen. As the ground-ivy was dead and withered, I gave them a few dock leaves, which they evidently partook of freely, returning to hybernation under their shelter. On Jan. 23rd I counted fifteen; they were all in the second stage. On Feb. 27th I could only see eight. On March 20th I counted nine, and discovered a small beetle in the pot. He was promptly ejected, and I blame him to this day for most of the mysterious disappearances. Cannibalism, although I never detected it, may account for the rest. On April 29th I had eight left, and I put them into a cage with a couple of inches of moss at the bottom. I now fed them upon groundsel, which they preferred to all other plants. On June 9th they began to spin up, but in every case *among the moss*. July 29th to Aug. 3rd (an uncommonly warm summer), seven fine moths emerged. Two were of the variety *lutescens* (with yellow under wings). This species is, I think, the most curious to deal with I ever met. There was very little to observe about the larvæ, as they kept themselves motionless and as much out of sight as possible by day. I never succeeded once in finding them actually feeding, although their growth between April and June was rapid. So it was with the moths: they emerged from the chrysalis, developed, closed their wings, and settled themselves as if for ever at the back of the cage. But disturb them, and they took off at once. One made straight for the window, which was open not more than half an inch, and got clear away. My opinion of their intelligence improved after this. I should not say they fly *fast*, but they fly *well* when they get a start—that is, they appear to be masters in the art of dodging and getting away.

Trichiura cratægi.—This is not only an interesting but easy species to rear from the egg, as its life-history occupies only five of the spring and summer months—that is, from the middle of April to the middle of September. A tumbler-glass, and afterwards a cage, are all the accommodation necessary. The larvæ are at first gregarious, and even in appearance they remind one very much of *Eriogaster lanestris*, to which species they are evidently closely related. The eggs I had hatched April 16th, 1898. I fed the larvæ on blackthorn, and all went well till I nearly lost them about the end of June. I had read somewhere that they made their cocoons among the food-plant, but they declined this hint altogether, and wandered restlessly about. I then put a couple of inches of moss in the bottom of the cage, and they at once disappeared in it. The moths emerged between the 7th and 14th of September.

Tæniocampa gracilis.—On June 24th, 1898, in Sealand Road, near Chester, I observed the unopened blossom-heads of meadow-sweet growing in the ditches to be spun together. On opening them I found each to contain a caterpillar more than half-grown of some noctuid. They presented the following appearance on July 2nd:—Head pale green, the face reticulated with brown. Dorsal and subdorsal areas grass-green, the subdorsal area paler. A mid-side black stripe. Below this black stripe there is a pale green stripe containing the blackish spiracles. Legs and claspers green. On July 13th they had reached the next or final stage, and began to pupate in the soil of the flower-pots. The following is a description:—Head and dorsal area warm pale brown, rather olive-brown. Subdorsal area paler. A mid-side black stripe toning off rapidly into the brown dorsal area. Below this black stripe is a pale brown stripe containing the white spiracles, which are surrounded by black rings. Legs and claspers brown. Newman gives a description similar to this as a varietal form, but *all* my caterpillars assumed this coloration. Some authors appear to describe the larva from the preceding or green stage, and I can nowhere find meadow-sweet (already fresh and green) given as a pabulum. My idea was that these caterpillars were most likely *Anchocelis litura*, but when

September passed and no moths appeared, I saw I must wait through the winter. They are coming out as I write (April 6th). The first emerged on April 2nd. Some have beautiful rose-coloured wing-fringes, but the tint quickly fades after death. I have always found *T. gracilis* to be comparatively scarce, and yet the caterpillars are evidently plentiful enough among the unopened flowers of meadow-sweet.

All the species I have referred to were kept from the first in the open air.

Chester: April 6th, 1899.

A NEW WAX-SCALE FROM WEST AFRICA.

By T. D. A. Cockerell, N. M. Agr. Exp. Sta.

Ceroplastes egbarum, n. sp.

Waxy female scales often crowded on the twigs, two or more coalescing; about 11 mm. long, 10 broad, and 6 high, the wax extremely thick, not at all divided into plates, snow-white, here and there with a suffused pinkish stain.

♀. Denuded of wax 5½–7 mm. long, 4 broad, 2½–3 high, very dark, with a dorsal hump but no lateral humps; anal horn a mere mammiform prominence. Boiled in caustic soda, the denuded females give a purple colour, which on dilution with water appears pink, and soon forms a flocculent pink precipitate. On adding nitric acid a flocculent white precipitate appears, but the pink precipitate is not altered. Skin after boiling remains yellowish brown, chitinous, with scattered minute gland-dots. Stigmatic areas with numerous crowded gland-spots, and many short and rather thick simple spines, but no capitate spines. Legs dark brown, the parts measuring thus in μ: Coxa, 120; femur with trochanter, 180; tibia, 128; tarsus with claw, 96 to 114. Tarsal digitules 60 μ, slender, with a small knob. Claw digitules with very large round knobs, extending about 15 μ beyond tip of claw. Antennæ apparently only 6-segmented, but the segmentation towards the end very obscure. The segments measure in μ: (1.) 45; (2.) 60–69; (3.) 66–78; (4.) 51; (5.) 69; (6.) 72. Segment 5 has a deep notch which makes it look as if divided into two.

Young larvæ under female about 430 μ long and 230 broad, tinged with a warm reddish colour. Male. Scales small, elongate, and glassy.

Hab. On *Mimosa*, near Abeokuta, the great city of the Egbas, W. Africa; collected by Dr. H. Strachan.

This is a fine wax-producing species, fully equal in this respect to the *C. ceriferus*, which produces the Indian white wax. On superficial examination it would be taken for *C. ceriferus*, but it differs in the dorsal hump of the female, and in the proportions of the antennal segments, 2 and 3 being subequal, whereas in *ceriferus* 3 is very much longer than 2.

Mesilla Park, New Mexico, U.S.A.: April 5th, 1899.

NOTES ON AMERICAN BEES.

By T. D. A. Cockerell,
Professor of Entomology, New Mexico Agricultural College.

Nomia nevadensis, Cresson.—La Luz, N. M., July 27th, 1898. (*C. M. Barber.*)

Nomia arizonensis, n. sp.—♂. In my table of *Nomia* ('Entomologist,' February, 1898) this runs to *N. compacta;* but the wings are very clear, with very dark broad contrasting hind margins. It is surely a distinct species, by this character, and the locality. Arizona. (*C. F. Baker*, 2304.)

Andrena chromotricha, n. sp.

♀. Length a little over 9 millim.; breadth of abdomen 2⅔ millim. Belongs to the group with the *mesothorax and abdomen minutely tessellate, not punctured;* the enclosure of metathorax triangular, granular, defined only by a line, with only the extreme base very slightly wrinkled; the process of labrum broad and truncate, the truncation broadly submarginate, the sides sloping; the clypeus with a smooth median line, its sides on each side of the line distinctly but not closely punctate, its anterior margin with a pair of long and strong yellowish bristles projecting downwards; the front beneath the ocelli strongly striate; the tegulæ very dark brown; the wings with the apical margin smoky; the abdomen with continuous but thin pale hair-bands; the apical fimbria sooty.

This species is closely allied to *A. apacheorum*, the description of which (Entom. 1897, p. 306) applies to it with these exceptions: it is a little smaller, especially in the abdomen; *the pubescence of the mesothorax and scutellum is a lively reddish orange;* the hair of the abdominal bands is hardly so long; the impunctate line on the clypeus is well-defined; the vertex is a little narrower; *the pubescence of the tarsi is entirely very pale yellowish*, like that of the tibiæ; the frontal striation is stronger. The first segment of the flagellum is about or hardly twice the length of the second, whereas in *apacheorum* it is a little over twice the length. The nervures are very dark brown, the stigma somewhat lighter.

Hab. Forks of Ruidoso Creek, New Mexico, July 30th, 1898. (*C. M. Barber.*) It is just possible that this is an extreme variety of *apacheorum*, but its characters seem specific. The two conspicuous clypeal bristles also occur in *apacheorum*, *fimbriata* (*americana*), *electrica*, *macgillivrayi* (rather small), *vicina*, &c.

Halictus lerouxii, Lep.—♀. Colorado. (*Gillette*, 2441.) *H. parallelus* of Ashmead's Colorado list is doubtless the same.

Halictus ligatus race *townsendi* (Ckll.).—To my surprise, Mr. C. M. Barber took two females of this in Mesilla, New Mexico, along with many ordinary *ligatus*. The insect was described (as *H. townsendi*) from Tropical Mexico.

Panurginus pauper var. *flavotinctus*, Ckll. — Prof. C. H. T. Townsend took two males at Dripping Spring, Organ Mountains, N. M., Aug. 10th. I formerly thought they might belong to *P. asteris*, Rob. The female of *flavotinctus*, taken at Santa Fé in August, differs from the male in the broader flattened abdomen, and the wholly dark face. It will be distinguished from the female of *albitarsis* by its small size (about 5 millim.), and the flagellum being ferruginous beneath after the fourth segment.

Panurginus albitarsis subsp. *fortior*, subsp. nov.

♂. About 6½ millim. long. Differs from Santa Fé *albitarsis* in being more robust, with a broader abdomen, having indeed the build of a female rather than of a male. Wings quite clear; stigma and nervures rather pale brown; face-markings a deep chrome-yellow, whereas in the Santa Fé insect they are pale lemon-yellow. Flagellum entirely black.

Hab. Mescalero, N. M., July 22nd, 1898. (*C. M. Barber.*) This is probably a valid species.

Panurginus barberi, n. sp.

♂. Length about 7 millim., black, with a thin short greyish pubescence, making the insect appear dusty; abdomen narrow with subparallel sides; head, mesothorax, and scutellum with large and rather dense punctures, not dense enough, however, to obscure the shining surface; metathorax with its middle part shining and impunctate, its base with a narrow transverse channel crossed by little ridges at frequent intervals; abdomen shining, with only a few small scattered punctures at the sides of the first segment, the other segments with the anterior half rather thickly but minutely punctured; antennæ entirely black; face scarcely hairy, clypeus (except two black dots, and the pale brown anterior margin) and lateral face-marks bright lemon-yellow; lateral marks rapidly narrowing above the level of the clypeus, ending in a sharp point (at an angle of about 45°) on the orbital margin just below the level of the antennæ; labrum mostly yellow; mandibles simply yellow at base, otherwise reddish brown, with a conspicuous tuft of hair on the lower margin about the middle; tubercles yellow with a hyaline spot; tegulæ testaceous: wings smoky, especially on the apical margin, nervures and stigma piceous; marginal cell with a long appendicular nervure; second submarginal cell receiving the recurrent nervures near the end of its first and beginning of its last fifths; legs black, bases of last four tibiæ, all the knees, basal two-thirds of anterior tibiæ in front, and basal joints of all the tarsi, pale yellow.

Hab. Mescalero, New Mexico, July 12th, 1898. (*Chas. M. Barber.*) In my table of *Calliopsis* and *Panurginus* this runs to *P. bidentis*, Ckll., but it will be easily known from that by its larger size, and the absence of the strong yellowish tint of the wings.

Calliopsis obscurellus, Cresson, 1879.—Three males and three females from Pasco, Wash., May 25th, 1896. (*T. Kincaid.*)

(To be continued.)

NOTES AND OBSERVATIONS.

'Entomological News,' which is in charge of the Entomological Section of the Academy of Natural Sciences, Philadelphia, and the American Entomological Society, has just entered on the tenth year of its existence. In the January number of the current volume, the editor, in referring to the present status of the journal, remarks:—"We are not infrequently confronted with the criticism that the subject has lost its poetry and the delicate touch of nature has been swept away, and, in its place, there is left a dreary list of scientific names, whose meaning can only be known to a favoured few, with large scientific libraries at their elbow, We try to remedy this in 'The News,' but receive no help from the critics; they talk, but do not act. We admit that descriptions of new species are as dry as dust under an infested specimen; but we owe more to the systematic worker than to the growler, who proclaims from the housetops what should be, but has never put pen to paper."

We can sympathize with our American contemporary, because we occasionally experience the same trouble ourselves.

Entomological magazines are the media through which all interested in the subject may communicate whatever they have to make known to the entomological public. It follows, therefore, that the contents of such serials are largely regulated by contributors themselves. Editors, as a rule, can only deal with such material as is voluntarily sent in for publication, or that can be obtained as a personal favour from workers in special branches. The practical part of entomology is perhaps most generally affected, and possibly those who are interested in field work far outnumber those who prefer the higher branches of the study. Consequently, it is perhaps a matter of surprise that the magazines are not more frequently furnished with accounts of collecting expeditions, or with communications dealing with new facts in life-histories or habits of insects. Judging from the exchange lists, it cannot be supposed that there is less active work in the field than formerly, but it must be admitted that collectors are far more reticent as regards their doings than they were.

Among the causes that have led up to this stagnation in field records, &c., the "Protection Committee," the present unsettled condition of nomenclature, and new systems of classification have been mentioned. As adverted to in a former note (*ante*, p. 16), the "P. C." cannot be charged with muzzling the collector, and as regards the other matters they have always been with us, and, so far as one can see ahead, are likely to continue to perplex us for many years to come.

Those who undertake the task of settling, or endeavouring to settle, intricate questions of synonomy, are entitled to our greatest respect, even athough the result of their labour, owing to the difference of opinion that obtains among synonymists as to accepting or rejecting certain works of early authors, is sometimes of questionable value. Systematists, too, are necessarily not quite in accord in their methods, and the result is that in classification the arrangement of one author is transposed by another; this has been very forcibly exemplified during the last few years. All things considered, then, there is no immediate occasion to materially alter our present nomenclature, and the arrangement of our collections may quite well remain as it is.

We hope that those of our correspondents whose letters have so far not been answered in any other way will find replies to their communications in the foregoing remarks.

THE NOMENCLATURE OF BRITISH LEPIDOPTERA.—May I be allowed a corner in the 'Entomologist' to correct an error which has unfortunately crept into the work of the North London Natural History Society on nomenclature (*antea*, 59–63)? No. 43 will have to be deleted altogether, as Mr. Kirby has made an unaccountable mistake, which we were unwise enough to follow without due investigation. *Aprilina*, Hb., is = *orion*, Esp., and therefore the generic name *Diphthera* is in nowise applicable to *aprilina*, L. On the *C. hyale* question we arrived at exactly the same results to which Prof. Aurivillius has since given the weight of his authority (*antea*, p. 72); while as regards the genus *Graphiphora*, Hb. (Kirby, Handb. Lep. v. p. 45), we find that its type, *G. nun-atrum*, Hb. 112 = *gothica*, Hb. Verz., is the true *gothica* of Linné, and not *c-nigrum*, Linn., as indicated by Mr. Kirby. If, therefore, the name *Graphiphora* is resuscitated, it will have to supplant *Tæniocampa*, Gn. (*vide* Grote, Abh. Nat. Ver. Bremen, xiv. Heft. i. p. 49.—LOUIS B. PROUT; 246, Richmond Road, N.E.

In reply to Mr. Prout's objections, I have to make the following observations:—

1. I plead guilty to having overlooked the fact that *aprilina*, Hb., is *orion*, auct., and consequently the latter would be the type of *Diphthera*.

2. It appears to be now established that the Tentamen is well before Ochsenheimer, vol. iv. I adopted O.'s use of *Graphiphora*, in which case Hübner's action (if later), having in view the confusion of the names *gothica* and *nun-atrum*, would make the type as I indicated it; but if the Tentamen is earlier, then O.'s use of *Graphiphora* must be ignored.

3. I adhere to my previously expressed opinion that the original *hyale*, Linn., is really *C. edusa*, auct., notwithstanding Prof. Aurivillius' opinion to the contrary. It is not the only case in which I have not been able to accept his conclusions respecting Linnean species. As regards Linné's citations for *hyale*, the case is as follows:—

Syst. Nat. (ed. x.), i. 1758. Petiver, Gaz. t. 14, f. 11 (*edusa*, ♀); Roesel, iii. t. 46, f. 4, 5 (*ed.* ♀ *col.*); Ray, Ins. p. 112, n. 6. Ray's insect is described as yellow, and the female as white, which might apply to *hyale*, auct.; but Petiver's figure is quoted, with the words "Papilio croceus, apicibus nigricantibus." Ray appears to have described *hyale*, auct., and quoted Petiver's figure and description of *edusa*, auct. Uddman, p. 56 (description only).

Faun. Suec. ed. ii. (1761), only Petiver and Ray quoted, under *hyale*, Uddman's description being referred to *palæno:* but Edw. Aves, t. 304, f. 1, 2, is quoted by error.

Syst. Nat. (ed. xii.), i. (2), 1767. Here the references given are to Scopoli, Petiver, Ray, Schæffer, Geoffroy, Edwards, and Roesel.

Edwards' figure is quoted in error; it belongs to *Callidryas eubule*, and is correctly referred to lower down on the same page; and this insect is called "luteis," though it does not differ in colour from other butterflies called "flavis" on the same page. The reference to Schæffer is wrong, and S. figures both species on one plate. Scopoli describes *edusa*, auct., treating Roesel's as the typical figure, but calls *hyale*, auct., the female. Geoffroy also describes *edusa*, quoting Petiver's and Roesel's figures, and making *hyale*, auct., var. *C.* We thus see that while the authors of the Linnean period confounded both species, they invariably gave *C. edusa* the foremost place, and quoted its figures as typical of *hyale*, Linn.; and Linné himself referred to their works as representing his species. I am still of opinion that these figures must be recognized as typical of the true *C. hyale*, Linn. L.'s own descriptions I have discussed in full elsewhere.—W. F. Kirby.

Preservation of Larvæ.—The following method of preserving larvæ is described by Mr. C. Abbott Davis in the March number of 'Entomological News':—"Drop the larvæ as soon as collected into a pint or quart jar of 2 per cent. formalin solution. Date the same and let it stand for a week. Remove the larvæ, putting several of each species into a 6 or 8 dr. 'shell bottle,' filling with fresh 2 per cent. formalin. Soak all corks in paraffin and keep bottle upright." The writer states that he has been especially successful with light green Sphingidæ and Bombycidæ, some of which were treated in July, 1897, and are in perfect condition at the present time. He adds, "Live pupæ may be injected and placed in the same bottles, making an inexpensive but beautiful collection."

The Nomenclature of British Butterflies.—Mr. H. J. Elwes, writing on this subject (Ent. Rec. xi. 78), observes:—"Personally, I hold the opinion that it is impossible to apply the rules of priority strictly, and that it is much better to use a specific name long applied, and generally known to Continental as well as British entomologists, than to attempt to make changes on account of doubtful and often trivial questions of priority or identification." With regard to the question of uniformity in nomenclature, Mr. Elwes suggests that the London Entomological Society should appoint a committee to consider the matter. Referring to generic names as used by Staudinger and in the 'Entomologist Synonymic List,' he considers that it will be necessary to alter some of these, but adds, "I cannot follow any of the authors' reasons for the generic names they have adopted [*antea*, pp. 32–37]. I am sure, however, that before one begins cutting up the old genera, one must study the whole of them thoroughly, and even then it will be found that it is hard, if not impossible, to say what constitutes a generic difference."

Entomology of the Isles of Skye and Lewis.—Any information concerning the entomology of these isles would be gladly received by G. W. Kirkaldy, St. Abbs, Wimbledon, Surrey.

Do Insects feel Pain?—"Some time ago an appeal for assistance to advance the interests of entomology was asked from a wealthy woman in this city [Philadelphia], and such assistance declined, on the ground that 'she had never wavered from a dislike to amateur collections of insects immolated on pins and whose long suffering no one could realize.' Now all this raises the question as to whether the lady is correct in her ideas on the subject. Even if entomologists did immolate live insects on pins, it is probable that they would not suffer pain; but as a matter of fact they are killed before being pinned, as otherwise they would be ruined as specimens. While insects do have sensory nerves, they are probably by no means as well developed as the motor nerves, which are essential in such active creatures. In the higher orders of animals and those which bring forth few young, pain is necessary to protect life, and the loss of this protection in insects is compensated for by fecundity. There are also direct experiments to prove that insects do not suffer pain. It is said that a dragon-fly will eat from the end of its abdomen as far as it may be fed to it. Also if the same insect be deprived of its abdomen and supplied with one of wax of the same size and weight, the insect will go about its business and pursue mosquitoes for food as though its anatomy had not been abbreviated. The nocturnal moths are also very tolerant of pins thrust through them in daytime, but when night comes they endeavour to depart, pin, tree and all, if pinned to the latter. The writer has been accused of cruelty by lady friends in starving to death the large bombycid moths, which, by the way, have no mouth parts, and only feed in the larval condition."—('Entomological News').

CAPTURES AND FIELD REPORTS.

Easter (1899) in the New Forest.—Arriving at Lyndhurst Road Station about 7.50 p.m. on Thursday, March 30th, my father and I were met by Mr. J. Wiltshire, of Bank, who was to drive us there. Bank is a small place about a mile from Lyndhurst. We arrived at our destination about 9.20, and after supper had a look at the sallows. *Tæniocampa stabilis* was very abundant, but a nice series of these and a single *T. gothica* completed our captures for that evening. A specimen of *Selenia illunaria* and several *Cerastis vaccinii* were also seen.

March 31st, we took two beautiful specimens of *Xylocampa lithorhiza* at rest on a birch-trunk a few inches from the ground, one *Xylina rhizolitha* in very fresh condition on a post, and a fine male of *Brephos parthenias* which my father took flying along the road. At sallows in the evening *Panolis piniperda* (two), *Xylocampa lithorhiza* (one), *Tæniocampa stabilis* and *T. pulverulenta* (*cruda*), *Phlogophora meticulosa* (one, exceptionally large) were taken, and *Selenia illunaria* was seen. *Tæniocampa stabilis* far outnumbered anything else every night, and perhaps the next in numbers was *Cerastis vaccinii*.

April 1st was a gloriously fine day, the sun coming out very strongly, and this was the only occasion on which we saw any butterflies. *Gonepteryx rhamni* (males) were absolutely swarming, a few *Pieris rapæ* were seen, and one *Vanessa urticæ*. After a very slow day's work, and just as we had folded our nets up and were approaching Lyndhurst, a specimen of *Vanessa polychloros* came up within easy striking distance. We came across a colony of *Brephos parthenias* among birches, but found them exceedingly difficult to catch. They flew quite out of reach, and we only succeeded in netting one, a female. A specimen of *Lobophora lobulata* was taken from a birch-trunk. We tried treacle as well as sallows in the evening, and saw the following insects at it:—*Tæniocampa munda* and *T. stabilis*, several *C. vaccinii* and *Scopelosoma satellitia*, and one *Eupithecia abbreviata* (?).

On subsequent nights treacle only produced a very few *C. vaccinii* At sallows *Tæniocampa stabilis*, *T. pulverulenta*, *T. gothica*, *T. rubricosa* (one), *Gonoptera libatrix* (one, fine), *C. vaccinii*, and *Larentia multistrigaria* (males) were seen. Several of the *T. stabilis* fell into a pond and were observed swimming on the surface. Is it usual for Lepidoptera to swim?

April 2nd was a failure so far as day-work was concerned, one specimen of *Xylocampa lithorhiza* on a birch-trunk being the only insect seen. At sallows the common Tæniocampas before mentioned turned up, also *T. rubricosa* (one), *X. lithorhiza* (one), and *Anticlea badiata*.

On April 3rd we revisited the place where we had found *Brephos parthenias* in the hopes of taking more, but again only succeeded in taking one, a rather small male. We found nineteen specimens of *Xylocampa lithorhiza*, eighteen on fir-trunks and one on birch. With the exception of one, all these insects were taken within twelve inches of the ground. *Xylina rhizolitha* (a fine specimen), *T. stabilis*, *Larentia multistrigaria*, and *L. lobulata* were also seen on tree-trunks. In the evening we tried the sallow where we had taken *P. piniperda*, and succeeded in taking four more. We should probably have taken others but for the help (?) of two of the forest men who were out on night duty—they have to keep a watch in the dry season in case of a fire. The bush being a large one, we had to shake only one branch at a time, so that the insects should fall as much as possible on the umbrella and newspaper; but one of the men to whom we had been talking was very anxious to help: "'Alf a minute, sir," says he; "Beggar'd if I doan't get oop and give 'un a shake," whereupon, in spite of our protestations, up he gets and shakes with such good will that every moth in that bush and half the bloom must have come down. We also saw, among other things, this evening, *X. rhizolitha* and *A. badiata*. We returned home on Tuesday, after having spent a very pleasant, though not wonderfully productive holiday.—F. M. B. Carr; 46, Handen Road, Lee, S.E., April 7th, 1899.

Locust in Hull.—On March 3rd a locust, *Acridium ægyptium*, was found alive on the pavement in Charlotte Street, Hull, by a Mr. Slater, but it died the next day. Mr. Slater gave it to me a few days afterwards.—J. W. Boult; 28, Wainfleet Terrace, Fountain Road, Hull.

Chœrocampa porcellus in Spring.—On March 20th ult. I was sent a freshly emerged specimen of *C. porcellus*, taken in a garden at Limpsfield, Surrey.—H. W. Shepheard-Walwyn; West Downs, Winchester.

Rhynchota at Woolmer Forest.—I stayed during Easter at my favourite southern haunt—Selborne, a pretty and secluded place itself, and within easy walking distance of Woolmer Forest. In some ponds in a private enclosure (over which I trespassed) in the latter I captured *Corixa bousdorffii*, *limitata*, *semistriata*, *venusta*, *scotti*, &c. (none of them by any means common species in the south), and in the forest itself I captured a number of macropterous and apterous individuals of *Hydroëssa pygmæa*, from a large reed-fringed pond. It was too early for very many land species, and I obtained nothing of much value, but I think that during August and September a number of good bugs ought to turn up, especially on Bramshott Common and from the little-worked neighbouring districts.—G. W. Kirkaldy; Wimbledon.

Phlogophora meticulosa in Winter Months.—On referring to my note-book I find I captured a fine specimen of *P. meticulosa* on Nov. 16th,

1894. A full-fed larva was found in my garden in the early part of last January which emerged a few days ago. The specimen mentioned by Mr. Gurney as having been caught in a greenhouse (*antea*, p. 78) was probably introduced there in the larval state when feeding on some plant. I have often found them feeding on the geraniums in my greenhouse during the winter. It is a hardy species and one of the easiest to breed. I have frequently reared them during the winter. The ova are deposited about Sept. 24th and hatch in eleven days, and with a little protection from the cold nights they will continue to feed without interruption until full-fed, which will be about the first fortnight in December. The imagines will emerge towards the end of February, but it will be necessary to let them have some artificial heat if the weather is very cold.—EDWARD RANSOM; Sudbury, Suffolk, April 11th, 1899.

BUTTERFLIES FROM NATAL.—My friend Mr. Henry Watt, Malvern, Natal, was so kind as to collect for me the butterflies which appeared at a fruit farm in the vicinity of Malvern during April and May, 1898. These he sent me in papers, in order that I might pick out a selection for the Elgin Museum. As the specimens were not singled out by him, but taken as they came, I think this list may interest your readers:—*Papilio demodocus*, Esp. (*demoleus*, L.), *P. lyæus*, Doubl., *P. cenea*, Stoll.; *Pieris severina*, Cram., *P. severina* var. *boguensis*, Feld., *P. agathina*, Cram.; *Terias zoë*, Hopff., *T. senegalensis*, Geyer; *Catopsilia florella*, Fab., *C. florella* var. *rhadia*, Bois.; *Teracolus omphale*, Godt., *T. theogone*, Bois.; *Danais chrysippus*, L.; *Nebroda echeria*, Stoll., var. *albimaculata*, Butl.; *Acræa natalica*, Bois., *A. cabira*, Hopff., *A. buxtoni*, Butl.; *A. encedon*, L., *A. mahela*, Bois., var. *neobule*, Doubl., *A. punctatissima*, Bois., *A. ecebria*, Hew.; *Atella phalanta*, Don.; *Hypanartia hippomene*, Hüb.; *Pyrameis cardui*, L.; *Junonia cebrene*, Trim., *J. clelia*, Cram.; *Precis cyrene*, Bois., *P. sesamus*, Trim., *P. archecia*, Cram., *P. natalica*, Feld.; *Salamis anacarlii*, L.; *Eurytela hiarbas*, Don.; *Hypanis ilithyia*, Don.; *Hypolimnas misippus*, L.; *Euralia mima*, Trim., *E. wahlbergi*, Wall.; *Crenis drusius*, Fab., *C. boisduvali*, Wall.; *Crenidomimus rosa*, Hew.; *Charaxes candiope*, Godt., *C. cithæron*, Feld.; *Palla varanes*, Cram.; *Mycalesis safitza*, Hew.; *Aphnæus natalensis*, Doubl.; *Plebeius thespis*, L.; *Tagiades flesus*, Fab. The only species calling for comment is *C. rosa* (one female), which Dr. Butler has been so good as determine, and which is now in the collection of the British Museum.—HENRY H. BROWN; Elgin, Scotland.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*March* 15*th*, 1899.—Mr. G. H. Verrall, President, in the chair. Mr. William Martin Geldart, M.A., of Norbiton; and Mr. Hugh Main, B.Sc., of Old Charlton, Kent, were elected Fellows of the Society. Mr. J. J. Walker exhibited several specimens of *Longitarsus rutilus*, Ill., a rare British species of Halticidæ, taken by him on March 11th at Halstow in Kent. Mr. Tutt exhibited a very fine series of *Epunda lutulenta* captured by the Rev. C. R. N. Burrows last autumn near Mucking in Essex. This series, while agreeing in the main with Borkhausen's typical form, varied *inter se* in such a manner as to give almost parallel forms to those so well known from Scotland and Ireland, yet they had the ordinary blackish-fuscous ground colour, and not the intense black ground colour peculiar to the latter. Mr. Merrifield showed some Lepidoptera collected in the latter half of May and the first week of June near Axolo (Venetia), Riva, and Bozen. They included some very fine specimens of *Syrichthus carthami*, a very large *Syntomis phegea*, and examples of *Pararge egeria* intermediate in colour between the Northern and Southern European forms. Mr. G. T. Porritt exhibited a series of extreme forms of *Arctia lubricipeda* var. *fasciata*, and also some examples of what appeared to be a new form of the species, of which he had bred a few during each of the past two seasons. Mr. O. E. Janson exhibited an inflorescence of *Arauja albens*, Don., together with a butterfly which had been entrapped by getting its proboscis jammed in the slit between the anther-wings of one of the flowers. It was found by Mr. C. J. Pool at Monte Video. Mr. Gahan stated that, having since examined the beetle from Peru shown by Mr. Jacoby at the previous meeting, he was now able to say definitely that it was a Longicorn, and represented a new genus to be placed in the group Acanthocinides of the family Lamiidæ. He exhibited this beetle along with a species of *Diabrotica* and a species of *Lema* from Peru, in order to show the remarkably close resemblance in coloration between the three species.

April 5th.—Mr. G. H. Verrall, President, in the chair. Dr. Frederick George Dawtrey-Drewitt, M.A., M.D., F.R.C.P., F.Z.S., of 2, Manchester Square, W.; Mr. William E. Ryles, B.A., of 11, Waverley Mount, Nottingham; and Mr. Albert Wade, of 1, Latham Street, Preston, were elected Fellows of the Society. Mr. Blandford exhibited insects of different orders collected by Dr. Albert L. Bennett in West Africa, and read some notes by Dr. Bennett on the habits of the Goliath beetles. In reply to the remarks which followed, Dr. Bennett stated that the male beetles use their cephalic horns in fighting with one another, as well as for puncturing the bark of vines in order to bring about a flow of the sap, upon which they feed. The Rev. Canon Fowler showed a photograph of a large bee's nest found in an open hedge near Wragby in Lincolnshire. Mr. McLachlan exhibited young larvæ of a "locust" received from Mr. E. A. Floyer, Director-General of Telegraphy in Egypt, and said by him to have caused the *Calotropis* trees in Nubia to be in a moribund condition. The larvæ were identified by Mr. Burr as those of a species of *Pœcilocerus*, probably *P. vittatus*, Klug. Mr. Burr exhibited a specimen of *Acridium ægyptium* which was found at Maidenhead. He also showed a remarkable clay model of a Locustid with a Chinese inscription underneath, and requested information as to the origin of such models. Mr. Blandford gave an account of a paper by Dr. A. Ribaga, published in the 'Rivista di Patologia Vegetale,' v, p. 348, on an asymmetrical structure occurring in the adult female of the common bed-bug, and apparently hitherto overlooked, although it communicated with the exterior by a conspicuous notch in the fourth abdominal segment, midway between the median line and the lateral margin. This structure consisted of a large quasi-glandular mass of unknown nature in which was encapsuled an organ consisting of fibres, the free ends of which terminated in minute chitinous spines in a recess lying under the fourth abdominal segment. The adjacent margin of the fifth segment was thickened and set with strong teeth. The non-glandular part of this singular structure was conjectured by its discoverer to be a stridulating organ; but no evidence of stridulation had been obtained. It was certainly far more complex than most, if not all, other stridulating organs known to exist in insects. Mr. G. J. Arrow communicated "Notes on the Rutelid genera *Anomala*, *Mimela*, *Popillia*, and *Strigoderma*."—J. J. WALKER and C. J. GAHAN, *Hon. Secs.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*March 23rd*, 1899.—Mr. J. W. Tutt, F.E.S., Vice-President, in the chair. A communication was read from Mr. T. D. A. Cockerell, of New Mexico, sent with the idea of raising a discussion. After stating the facts that tropical species are, as a rule, much more easily separated than the species of temperate regions, and that holarctic groups were especially polymorphic, he went on to discuss the causes of these phenomena. He noted that owing to conditional changes, such as the various glacial desolations, in the temperate regions, species were ever answering to this environment and being newly formed. In the tropics, on the other hand, the environment was more stable, and no doubt had been so for an indefinite period, hence the easier definibility of the species in those regions. In the discussion which ensued, numerous Palæarctic groups of very closely allied species were mentioned, and the necessity of naming the various forms, as a matter of convenience for study and reference, was generally conceded. Mr. Montgomery read notes on a series of broods of *Pieris napi*, reared originally from ova deposited by a female from Enniskillen, compared with bred series from Middlesex, to show the typical dimorphism. The Irish specimens were especially noticeable for the brilliancy of the yellow on the under sides. A long discussion ensued, and the members present considered that it was most necessary, in all experiments of this nature, that every specimen bred should be preserved with its label giving full details. Mr. F. N. Clark exhibited specimens of the mite, *Psoroptes longirostris*, taken from a rabbit, on which it produced a skin affection and suppuration. Mr. Adkin, a wasp's nest of several cells, found in a hand of tobacco from Kentucky. It was made of mud, and no doubt the inhabitants were killed during the smoking process over wood fires. Mr. Montgomery, numerous coloured drawings of the eggs and first instar of the larvæ of several species of British butterflies.

April 13th.—Mr. A. Harrison, F.L.S., President, in the chair. Mr. Crabtree, F.E.S., of Levenshulme, Manchester, was elected a member. The evening was devoted to microscopy under the direction of Mr. Scourfield, F.R.M.S.—HY. J. TURNER, *Hon. Rep. Sec.*

CARLISLE ENTOMOLOGICAL SOCIETY.—*March 2nd*, 1899.—Mr. James Murray in the chair. The Chairman showed several species of the genus *Anaspis*, viz. *frontalis*, *melanopa*, *fasciata*, and *ruficollis*, from Carlisle. Mr. F. H. Day showed *Bembidium monticola* and *B. rufescens*, taken on the banks of the Eden; *Carabus granulatus* and *Cychrus rostratus*, from rotten wood at Durdar; *Philonthus fulvipes*, *Stilicus orbiculatus*, *Quedius attenuatus*, and *Q. cinctus*, from flood-refuse on the banks of the Petteril. Mr. G. Wilkinson exhibited *Micropteryx calthella*, *M. aureatella*, *Eriocrania caledoniella*, *E. sangii*, *E. semipurpurella*, *E. purpurella*, *E. subpurpurella*, and *E. sparmanella*, all taken in the Carlisle district. A paper was read, on Lepidoptera taken at sugar and light in 1898, by Mr. J. E. Thwaytes.

April 6th.—Mr. James Murray in the chair. Mr. F. H. Day exhibited Coleoptera—*Rhagium inquisitor*, *Ocypus brunnipes*, *Lampyris noctiluca*, from Keswick; *Rhizophagus cribratus*, taken near Carlisle, from fir bark; *Erirrhinus bimaculatus*, *Lesteva sicula*, *Dyschirius salinus*, taken on Easter Monday at Burgh Marsh. Mr. Murray showed *Saprinus maritimus* and *S. æneus*, from Silloth; *Omosita discoidea* and *O. colon*, from Carlisle, and *Liodes humeralis*, from Gelt and Newbiggin. Mr. H. Mawson, *Tephrosia bistortata* and *T. crepuscularia* (*biundularia*), from a fir wood at Portinscale, near Keswick. Mr. J. Wilkinson read a paper on Mimicry.—G. B. Routledge, *Hon. Sec.*

Kendal Entomological Society.—*February 13th*, 1899.—The President in the chair. After the preliminary business, the Rev. A. M. Moss made some remarks upon the early spring Geometræ, urging the members to lose no time in at once restarting some active outdoor work, and then securing good series of some of the commoner species, too often rather neglected owing to the hybernating propensities of man at this time of year. He exhibited three drawers containing the Amphidasydæ, Hyberniidæ, and Larentiidæ, by way of illustrating the species referred to, and a general discussion was enthusiastically joined in. The exhibits also included a case of newly relaxed and set South American Lepidoptera, by Mr. T. Smith, and a brightly coloured specimen of one of the Pieridæ from Singapore by Mr. Macrea. Towards the close of the meeting, Mr. Moss made some suggestions as to his method of blowing and preserving larvæ.

March 13th.—The President in the chair. Two new members were elected. The Rev. A. M. Moss gave some practical hints on "sallowing," and a keen discussion followed. Mr. Graveson exhibited some fine Indian and South American butterflies, recently relaxed. Mr. Holmes, an exceptionally large male of *Phigalia pilosaria*. Mr. Littlewood, many specimens reared from ova and recently forced, including good series of *Euplexia lucipara*, *Noctua plecta*, *Hadena thalassina*, *Smerinthus populi*, and *S. ocellatus*. Mr. Smith, larva of *Agrotis porphyrea*. Mr. Wright, a new relaxing tin of his own invention. Mr. Moss, a sample case of the genus *Tæniocampa*, and many other species to be met with at this time of year.

April 10th.—The President in the chair. A paper by Mr. H. B. Prince, of the Lancashire and Cheshire Entomological Society, was read before the Society, dealing with some of his varied experiences in 1898, and especially with his success at sugar on the Wallasey sandhills, at a time when sugar was of no avail whatever in the Kendal district, Mr. Moss reported having found apparently fresh remains of an imago of *Euchelia jacobææ* in an oak plantation on April 3rd. Mr. Littlewood showed a fine series of recently forced *Pieris brassicæ* and *P. rapæ*, and odd specimens of *Sesia culiciformis*, *Eriogaster lanestris*, and several noctuæ. Mr. Moss, a drawer of Sphinges, and recent captures. Mr. Wilkes, *Amphidasys prodromaria*.—A. M. Moss, *Hon. Sec.*

Lancashire and Cheshire Entomological Society.—*March 13th*, 1899.—The President in the chair. After the reading of the minutes, the President reviewed the first volume of Mr. Tutt's new work on

British Lepidoptera, and recommended it to all students of that Order. Mr. Burgess-Sopp, of Hoylake, read his paper on "Our Cockroaches." Beginning with the most ancient known form, *Palæoblattina douvillei*, found in the Caradoc beds of Calvados, in France, he traced the history of the order as shown by fossil remains through the carboniferous, mesozoic, and cainozoic periods down to the present. The Blattodea were most numerous in the carboniferous period which he designated the "Age of Cockroaches." Since then the number of species has gradually dwindled away, until at the present day we cannot boast of more than three truly indigenous to the British Isles. Throughout this vast period the change undergone in their structure has been very small indeed, consisting chiefly in the thickening of the anterior pair of wings into elytra. He enumerated ten species now found in Britain; three of these—*Ectobia livida*, *E. lapponica*, and *E. panzeri*—being indigenous; four introduced, viz. *Blatta orientalis* (the common cockroach), *Periplaneta americana*, *P. australasiæ*, and *Phyllodromia germanica*; and three occurring as occasional visitants from abroad, viz. *Rhyparobia maderæ*, *Leucophæa surinamensis*, and *Blabera gigantea*. He then gave an account of the life-history of *Blatta orientalis*, illustrating his remarks by means of well-executed figures. He also exhibited a case containing the species mentioned in his most interesting paper. Other exhibits were, a delicate green cockroach by Mr. F. N. Pierce; remarkable varieties of *Camptogramma bilineata*, by the President; British Carabidæ, including the rare *Carabus auratus*, *C. nitens*, and *C. clathratus*, by Dr. J. W. Ellis; Lepidoptera by Mr. H. B. Prince, and *Rhagium bifasciatum*, taken in February by Mr. F. Birch.

April 10*th*.—In the absence of the President and Vice-Presidents, the Rev. R. Freeman, M.A., occupied the chair. Owing to a sudden attack of ilness the lecturer for the evening, Mr. Robert Newstead, of the Grosvenor Museum, Chester, was not able to be present, and the members were thereby deprived of the pleasure of hearing his lecture on "The San José Scale and newly introduced Scale Insects," to have been illustrated by oxy-hydrogen light. Mr. F. N. Pierce read some interesting notes from Mr. Louis B. Prout on the much disputed species of the genus *Oporabia*, and showed many specimens of the forms *dilutata*, *autumnaria*, and *filigrammaria*. Other exhibits were—of the order Lepidoptera, specimens from the Delamere, Eastham, and Knowsley districts, by Mr. F. C. Thompson, Mr. H. B. Prince, and the Rev. R. Freeman respectively, local forms and interesting varieties being well represented; of the order Orthoptera, *Blabera gigantæ*, taken in the Liverpool Docks, and *Panasthia javanica*, received from abroad by Mr. E. J. Burgess-Sopp; of the order Coleoptera, Mr. R. Wilding exhibited his collection of Bembideous Carabidæ, which is a model of neatness and order, and contains many local, rare, and otherwise interesting species. *Carabus glabratus*, from Sty Head Pass, Cumberland, was shown by Mr. F. Birch. It was resolved that the meetings be adjourned till October 9th, on which date the chief exhibitional meeting of the year will be held.—FREDERICK BIRCH, *Hon. Sec.*

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—*February* 20*th*, 1899.—Mr. P. W. Abbott, Vice-President, in the chair. Mr. R. C. Bradley showed some rare Phycidæ, Galleridæ, &c., presented by Dr. P. B. Mason to the type collection. Mr. J. T. Fountain, *Sphinx lugustri*, from Salfard Priors. He said that he had found larvæ there in 1897, on privet; on searching in the same place for more, in 1898, he found they had apparently forsaken the privet, for he could only find two on it, but found a number on ash. Mr. A. H. Martineau said that he had found them at Solihull on the leaves of a small spineless holly, and reared them on it. Mr. P. W. Abbott showed a series of *Apamea unanimis* taken at Wicken, and including one dark specimen. Mr. Fountain also exhibited *Hybernia marginaria* var. *fuscata* and *H. rupicapraria*, taken the night before at Small Heath. Mr. Martineau, photographs of butterflies in the kromsköp.

March 20*th*.—Mr. G. T. Bethune-Baker, President, in the chair. Mr. P. W. Abbott showed *Epinephele hyperanthus*, under sides, from Carlisle, three being var. *arete*, and three being *very* pale with usual sized spots; also three typical specimens for comparison. Mr. Bethune-Baker, a lot of Lycænidæ, including a big series of *L. icarus* from many localities, with blue forms of the females from North Wales, and others from Brusa, Asia Minor, in which the females showed a shade of blue; also nice forms of *L. corydon* from Spain &c. Mr. R. C. Bradley, *Paraponyx nymphæata* and *P. stagnata*, from various localities, including two white *P. stagnata*, small in size, with the markings very faint, locality unknown. Mr. G. H. Kenrick read a paper upon "Some Phases of Variation among the Lepidoptera." He divided varieties into seven different kinds—(1) permanent variation of double broods = seasonal dimorphism; (2) permanent local forms not occurring with the type, such as *Lycæna salmacis*; (3) persistent variations occurring with the type, such as *Argynnis valesina*; (4) species which occur in two or more well-marked forms, sometimes connected by intermediates, sometimes not, such as *Apamea oculea*, *Miana strigilis*, &c.; (5) occasional and yet persistent varieties, such as yellow Zygænas, Arctias, &c.; (6) permanent food-plant forms, of which *Tæniocampa gracilis* apparently presents an example; (7) the rare erratic abnormality. He exhibited four drawers of insects, including good examples of each class, and described them more or less at length.—Colbran J. Wainwright, *Hon. Sec.*

RECENT LITERATURE.

The Lepidoptera of the British Islands: a Descriptive Account of the Families, Genera, and Species indigenous to Great Britain and Ireland, their Preparatory Stages, Habits, and Localities. By Charles G. Barrett, F.E.S., &c. Vol. V. Heterocera Noctuæ. 8vo, pp. 381. London: Lovell Reeve & Co. 1899.

The present volume deals with the Trifidæ section of the Noctuina group, and comprises reference to one hundred and eleven species and forty-five genera, commencing with *Celæna haworthii* and concluding with *Xanthia ocellaris*.

The arrangement of genera is not quite that we have been accustomed to, neither does it agree with the system of any other recent author. The changes in this particular that have been made are not likely to cause the reader very much trouble, and there are but few alterations of the generic names that students of British Lepidoptera have been in the habit of using.

In his remarks on the variation of *Hydrœcia nictitans* (p. 64), our author says:—"Some entomologists profess to be able to separate some of the forms, as a distinct species, under the name of *lucens*, but for this there is not, in my opinion, any ground." In this view we quite concur, and think that the endeavour to specifically separate *lucens* from *H. nictitans* is about as unreasonable and as much opposed to fact as was the suggestion that *Miana fasciuncula* was simply a form of *M. strigilis*, to which Mr. Barrett also refers (p. 17). We are rather surprised, however, that when he points out the differences between the two last-named species, he does not mention the tufts on the back of the abdomen, which serve to distinguish one species from the other more readily (because more easily examined) than do the sexual organs.

Bondii, Knaggs, is retained in *Tapinostola*, and *morrisii*, Meyrick, is given as a synonym. *Brevilinea*, Fenn, is included with *lutosa*, and *phragmitidis* in *Calamia*. *Suspecta* and *upsilon* are removed from *Orthosia* and placed in *Dyschorista*, whilst *ferruginea*, *rufina*, *pistacina*, *lunosa*, and *litura* are associated with *lota* and *macilenta* under *Orthosia*. *Prodenia littoralis*, *Leucania l-album*, *Mesogona acetosellæ*, and *Caradrina superstes* are each mentioned, but neither of them recognised as strictly indigenous to our islands.

The remarks concerning habits, &c., of the species are often of an exceedingly interesting character, as the following extracts will show. Thus, in discussing *Celæna haworthii*, our author says (p. 4):—"The male in its favourite moorland haunts is a very lively creature, and flies briskly about among heather and cotton-grass in the afternoon sunshine; after a short flight, evidently for its own pleasure, it settles on the tip of one of the long leaves of the *Eriophorum*, and instantly runs down its under side to the ground, where it is quite concealed; or when it rests on the heather, taking the same course on the smallest alarm. But its favourite time of flight is early dusk, and then it dashes about in multitudes, and at the wildest speed, over the moors. But Mr. Stott has recorded, in the 'British Naturalist,' that the moment a wild flying male passes a tuft in which a female is concealed, its flight becomes slow and steady as it examines the tuft, and that by watching such a tuft hundreds of males may easily be taken. I had on one occasion a more singular experience than this: the moths were in full flight and passing continually, when I noticed that several were running over a small mound of earth like an old ant-hill, covered with short grass and a few tufts of *Eriophorum*. These I secured, and other specimens at once came; so, kneeling down to box them easily, I found that the fresh arrivals in their fatuous eagerness actually ran over my hands while I was boxing their companions, so many as I cared for. Yet no female was there, and though I dug up and examined the tufts of cotton-grass, pulling them thoroughly to pieces, and also dug up the turf, no pupa nor pupa-skin, nor any indication of the presence of a female, could be found, though without doubt some trace of its recent presence must have been perceptible to the other sex. In fact, the only females which I obtained at all were those which climbed up and hung upon blades of grass and of cotton-grass, or sprigs of heather, earlier in the evening, before the flight of the males. This species is readily attracted by sugar placed on the trunks of pine trees in its haunts, or on the herbage; it also frequents heather bloom, and the blossoms of ragwort and thistles, by day as well as by night, and is strongly attracted by light. In the fens, where it is rare, this last is the only method by which I have known it to be obtained."

Then, in connection with *Miana captiuncula*, Mr. Barrett (p. 25) gives the following information, supplied to him by a correspondent:—"It is a day-flier; but no one has, as yet, proved that it is not also a night-flier; we used to think that it did not fly after mid-day, but now know better. It begins to fly about noon, and rarely continues much later than 4 o'clock p.m., but its habit of flight is most erratic. You may go to the bank where you know that it occurs, upon an apparently faultless day, and wait for an hour without seeing a single specimen, and then suddenly see them dashing about in all directions. It is no easy matter to catch them, as they fly quickly and are difficult to follow, and are sure to disappear as suddenly as they came. Then the best plan is to look upon the grass stems, where a few may be picked up. After a short time they will suddenly appear again for a short flight. If you are so fortunate as to get near where a newly-emerged female is sitting, you may stand still and catch them as they come, with unerring instinct, from all directions."

On p. 266 we have a *résumé* of the known British history of *Hydrilla palustris*, which, having regard to the occurrence of the species in Wicken Fen last year in fair numbers, it may be interesting to give it in its entirety:—"The first specimen known to have been obtained in this country was captured in a moist place at Stockton-in-the-Forest, about four miles from York, by a young man in the employment of Mr. T. H. Allis. He seems to have met with other examples, but, not knowing the species, had retained this one specimen only, unset, until Mr. Allis's return from a journey, when it was placed in his collection, and doubtless is still in existence in the York Museum. Although Mr. Allis most emphatically affirmed, and indeed proved, the capture of the specimen, he seems never to have recorded the year in which it took place; but this was certainly before 1855. So far as can be ascertained, the next specimen taken was recorded by Mr. H. Jenner-Fust, who says that it was obtained in Quy Fen, Cambs, in May, 1862, by Mr. Schofield; and that it was disturbed from among some half-dried grass which had been cut a day or two, and when disturbed, which was in the daytime, flew pretty quickly. Another specimen, which may possibly have been antecedent to this, or even to the Yorkshire specimen, was taken by the late Richard Weaver, but where is not known. It had remained unset in the collection of the Rev. Henry Burney for many years before it was recognised as a female of the present species. In June, 1869, I had the peculiar pleasure of capturing a male specimen just outside the city of Norwich. It was fluttering about a gas-lamp in a suburban road towards midnight, having doubtless being attracted by the light from some moist meadows. In June, 1877 and 1878, Messrs. F. D. Wheeler, W. H. B. Fletcher, and others, took, in all, between a dozen and twenty specimens in Wicken Fen, by the aid of a strong collecting lamp. They found that a lamp placed upon the ground was the most useful as regards this species, since it seems to have a curious habit of creeping and fluttering about among grasses and coarse herbage, so as to be most difficult to capture; yet it is hardly ever to be seen on the wing. Dr. Wheeler says:—'It creeps up through the herbage, and dodges and sneaks about the lamp in a very troublesome way. I took two, both of which came on nights so bad that nothing but a strict sense of duty took me out; indeed, on one of these nights, from 9 p.m. till 2 a.m., only two moths came to my lamp. One of these was *H. palustris*, the other *Macrogaster arundinis.* Of fifteen *H. palustris* taken in the fen this year (1878), one only was taken flying, ten feet above the ground, over a lamp. We all placed our lamps very low for this species; and some had two lamps—one high in the air, the other on the ground; in which case the latter always was the one sought by *H. palustris.*' . . . There is an old specimen, of which the record seems to be lost, in the collection of the late Mr. H. Doubleday, in Bethnal Green Museum [*cf.* p. 380, where it is stated that this example was taken by Mr. English at Quy Fen in 1871]; and in the cabinet of Mr. P. M. Bright is another, labelled as having been taken at Ringwood, Hants, flying by day, but without date of capture or name of captor. Two of the more recent specimens of which I have any knowledge were exhibited at a meeting of the Entomological Society of London in February, 1898, by Mr. G. B. Routledge. These, both of which are females, were captured in 1897, fluttering among grass about 5 p.m., in a meadow a few miles from Carlisle."

Report of Observations of Injurious Insects and Common Farm Pests during the Year 1898, with Methods of Prevention and Remedy. By Eleanor A. Ormerod, F. R. Met. Soc. &c. 8vo. pp. 138. London: Simpkin, Marshall, Hamilton, Kent & Co. 1899.

In this the twenty-second Report there is a mass of information that will certainly prove of much usefulness to the farmer and fruitgrower. As regards the kinds of insect-attack during the year 1898, these appear to have been more than usually varied. Altogether about seventy sorts of infestation are mentioned, the majority of which are species of Coleoptera or Lepidoptera. Amongst those attacks that were more severe than usual, Aphides would seem to have held the first place, while larvæ of *Pieris brassicæ* and *P. rapæ* occurred in abnormal numbers. In some parts of the country *Pulex irritans* apeared in strong force, and from certain localities was reported as a plague.

A rather troublesome caterpillar, which, by the way, has not been previously much noticed, is that of *Laverna atra.* The larva of this moth, we are told, effects considerable injury to apple-blossoms by boring into the young growing shoots and eating the pith, thus cutting off nourishment from the flower-buds, and causing the whole cluster to droop and die.

In the chapter on the "Murrain Worm" some interesting particulars are given of the larva of *Chærocampa elpenor*, which, in Ireland, is erroneously credited with causing sickness in cows. With regard to this popular but mistaken belief in the harmful nature of the larva in question, Miss Ormerod says:—"Methods of prevention and remedy are not needed; . . . . but—looking at the widespread belief of illness to cattle being caused by their eating some small creature or caterpillar, which, when sent for identification, proved to be the larva of the elephant hawk-moth, which most especially feeds on plants growing by ditches or in wet places—it would appear to be worth while for some qualified observer, when opportunity should occur, to find whether the illness—the so-called "murrain"—may not be attributable to some poisonous water-plants, which, if known of, could be removed."

As usual in these Reports, the illustrations are excellent.

Bulletins (New Series) issued by the United States Department of Agriculture. Division of Entomology, Washington, 1898:—

No. 15. "The Chinch Bug: its Probable Origin and Diffusion, its Habits and Development, Natural Checks, and Remedial and Preventive Measures, with Mention of the Habits of an Allied European Species. By F. M. Webster." Pp. 82, 12 figures in the text, and 7 maps showing distribution.

No. 16. "The Hessian Fly in the United States. By Herbert Osborn." Pp. 58, pls. 2, map, and 8 figures in text.

No. 17. "Proceedings of the Tenth Annual Meeting of the Association of Economic Entomologists." Pp. 104.

No. 18. "Some Miscellaneous Results of the Work of the Division of Entomology. III." Pp. 101, 17 illustrations.

OBITUARY.

Charles Stuart Gregson died on January 31st, 1899, in the eighty-second year of his age. Like most of his colleagues, Gregson was a man of great powers of endurance, and in this lay much of the secret of his success. He appears to have commenced writing so long ago as 1842, when he published a note in the 'Annals of Natural History' on *Nyssia zonaria*, and he seems to have written over fifty notes and papers considered sufficiently valuable to have secured a place in the Royal Society's Catalogue of Scientific Papers, but these are exclusive of innumerable shorter contributions to the various periodicals. He took a warm interest in the Natural History Societies of his district, and at one time, as secretary of one of them, issued reports of the meetings, lithographed by himself. He amassed a magnificent collection, wonderfully rich in varieties and aberrations, and this he sold in 1888 to Mr. Sydney Webb, his eyesight having failed. It was estimated to contain approximately 28,000 specimens. But he immediately started afresh, and had formed another collection of about 5,500 specimens after he had turned seventy-two, and we are told that his sight practically recovered. He was a keen naturalist in a wider sense than a collector of British Lepidoptera. At one time he published a list of the Coleoptera of his district. It may truly be said of him that he had in him all the requirements for a scientific entomologist.—E. M. M.

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EUCHLOË GRÜNERI AT CANNES.

BY T. A. CHAPMAN, M.D.

ON March 3rd, 1899, I took, at Auribeau, near Cannes, a *Euchloë* which puzzled me. I entered it as *euphenoides*, because I felt sure it was not *cardamines*, and no other species seemed possible. Still, I could not persuade myself it was *euphenoides*, and so imagined it was perchance a hybrid between those species. Taking it to M. Constant, to compare with his collection, it agreed almost absolutely with specimens from Eastern Europe, labelled *grüneri*. Suggesting that it was an unlikely species to be taken so far west, he said, "Why not?" and pointed out that I was in a position that reminded me of the English schoolboy who takes *Pieris daplidice* whilst the ordinary collector does not, because he never looks at a white butterfly. He said he should never think of bagging a *cardamines* or a *euphenoides*, and *grüneri*, if it appeared but rarely, would escape along with these from any Provençal collector. The *grüneri* at South Kensington have no specimens agreeing precisely with mine, or with those like it in M. Constant's series. They are smaller, and the pale portions of the fringes are whiter.

My specimen is like a *cardamines*, with a wash of yellow on the upper surface, not so deep as that of *euphenoides*. The discal spot is very large, as in *euphenoides*, and accompanied by a dark shade across the wing, as in that species, continuous with a dark shading along the costa. The black at the wing bases is also more extensive than in *cardamines*. Beneath it resembles *cardamines* most, but the green markings of hind wing are somewhat more restricted, with wider and more open clear spaces, though just along the costa more numerous and darker, as often occurs in *euphenoides*.

I cannot entirely get rid of my first impression that this is a hybrid between *cardamines* and *euphenoides*. The date of its appearance was a fortnight earlier than *euphenoides* this year, and three weeks before *cardamines*, which this year was very late—later than *euphenoides*, though it is usually earlier. Though these two species are exceedingly distinct, the little I have done to elucidate this specimen leaves me with an impression that a series of these species, and of *grüneri*, *damon*, and one or two others from a sufficiently great number of different stations, would result in some difficulty being experienced in precisely demarcating them. Under this impression the further hypothesis as to my specimen arises, that it is an atavistic aberration of, say, *cardamines* that occurs in Eastern Europe as the defined species *grüneri*, which has at least two forms—that I saw in M. Constant's collection, and that, that is well represented in the British Museum.

Betula, Reigate: April, 1899.

[Dr. Chapman has been good enough to allow us to examine this very interesting specimen, and we are quite disposed to believe with him that it is a hybrid *cardamines* × *euphenoides*. In general respects the specimen is perhaps more *cardamines* than *euphenoides*, but at the same time it exhibits fairly strong traces of certain *euphenoides* characters.

With regard to yellowish colour, it may be mentioned that *cardamines* (*thibetana*, Oberth.) from Western China is of this tint, whilst some examples of *cardamines* from Syria (coll. Leech) have traces of a black internal edging to the apical patch.—Ed.]

HYALE OR *EDUSA*.

By Henry H. Brown.

This vexed question is revived in the 'Entomologist' for May. I propose to call a witness who has not hitherto been directly adduced in the controversy—Prof. Bergstrasser. The second part of his 'Nomenclatur und Beschreibung der Insecten in der Grafschaft Hanau-Munzenberg,' published at Hanau in 1779, contains well-executed figures of two species now included in *Eurymus* (*Colias*). These are thus named by him:—

Plates 2 (figs. 3 and 4) and 18 (fig. 1):

Hyale P. D. C. alis integerrimis rotundatis flavis, posticis macula fulva, subtus puncto sesquialtero argenteo. Linn. S. N. 2, 764, 100; Fabric. 477, 148; Rai, 112, 6; Mouffet, 100; Uddm. Dissert. 56.

Papilio alis luteis, &c., Geoffr. 2, 112, 48
Der Pomeranzenvogel, Mull. N. G. D. I. 593, 100; Fuesl. 554.
Calais, Cramer, tab. 53, C, D.
Der Geisstaudenfalter, W. S. 165, 3.
Das rare Gelbe, O. Gladb. Pr. 60, Kr.
Der pomeranzen gelbe Heuvogel, Esper, p. 71, t. 4, f. 3.

Plate 2 (figs. 5 and 6):

PALÆNO P. D. C. alis integerrimis rotundatis flavis, apice nigris, margineque fulvis, posticis subtus puncto argenteo. Linn. S. N. 2, 764, 99; Fabric. 476, 147, Uddm. Dissert. 56

Papilio alis sulphureis, &c., Geoffr. 2, 112, 6, C.
Palæno, Cramer, t. 14, F, G.; Schœff. Ic. 149, f. 4, 5.
Der Silberpunct. Mull. N. G. D. I. 593, 99.
Der Kronwickenfalter, W. S., *l. c.*
Das gemeine Goldne, O. Gladb. Pr. 8, Kr.
Der schwefelgelbe Heuvogel, Esper, p. 68, t. 4, f. 2.

Comparing these species with those in Mr. Kirby's 'Handbook to the Order Lepidoptera' (1896), it is clear that Bergstrasser's *hyale* is identical with the *hyale* of the 'Handbook,' the hind-marginal black border extending to the posterior angle of the anterior wings, and intruding upon the inner margin over an orange-yellow ground colour. His *palæno*, on the other hand, corresponds exactly with *kirbyi* of the 'Handbook,' the *hyale* of Curtis, and others. It therefore appears that Bergstrasser, writing in 1779, had arrived at the same conclusion as Mr. Kirby, namely, that the butterfly called in England the "clouded yellow," and known as *edusa*, was the *Papilio hyale* of Linnæus. If any of your readers should wish to examine the original, I shall be glad to put them in communication with the owner of the copy of Bergstrasser's scarce book, from which I have been quoting.

Rosefield, Elgin.

NOTES ON THE INDO-AUSTRALIAN PAPILIOS IN THE COLLECTION OF MR. H. J. ADAMS, F.E.S., WITH DESCRIPTIONS OF NEW SPECIES.

By PERCY I. LATHY.

Troides fasciculatus, sp. nov. (♂, ♀).—Closely allied to *T. dohertyi*, Ripp., but may be distinguished by the adnervular whitish streaks of fore wings below being merged together, thus forming a wide fascia. *Hab.* Salibaboo.

T. flavicollis, Druce.—Type of ab. loc. *olympia*, Honr.

Papilio polydorus, Linn.—Two pairs from Batjan.

P. annæ, Feld.—A single specimen of the male differs from the description given by Mr. Rothschild, Nov. Zool. ii. p. 243, in the following particulars:—Cellular spot small, only occupying lower end of cell; five discal white markings, of which the three centre ones are the largest; all the submarginal spots below are reddish.

P. phlegon, Feld.—Differs from the preceding in the more rounded apex of the fore wings; cellular spot occupying two-thirds of cell. Seven discal spots, of which the third, sixth, and seventh are the largest. Submarginal spots whitish, the two posterior ones reddish below; tails shorter and less spatulate.

P. camorta, Moore.—A series from the Andamans.

P. neptunus, Guér., ab. *sumatranus*, Hagen.—A male from Sumatra, with only one very small red spot on hind wings, between second and third median nervules.

P. fehri, Honr.—Type. ♂.

P. kühni, Honr.—Types. ♂, ♀. East Celebes.

P. malayanus, Wall.—Specimens from Burmah and Siam belong to this form.

P. artaphernes, Honr.—Type. ♂. Bangkei.

P. beccarrii, Oberth.—Co-type. ♂. Dorey, New Guinea.

P. albinus, Wall.—The series of this species includes the type of *P. sekarensis*, Honr.; Honrath treated ab *lesches*, G. & S., as typical *albinus*, Wall.

P. lowi, Druce, ♀, ab. *suffusus*, ab. nov.—I propose this name for the dark form of the female. Nov. Zool. ii. p. 321.

P. schmeltzi, Herr.-Schäff.—A series of eleven males and three females, which exhibit considerable variation. Several males have on the fore wings a faint yellowish white line extending from costa to first median nervule; in others this is much shorter, and in two specimens entirely absent. The light patch on hind wings also varies considerably in size. The orange lunules of hind wings below are large and distinct in some, and in others small and obscure. The females vary in a similar manner.

P. lunifer, Rothsch.—♀. Similar to male, but paler; the light band of fore wing extending to costa, this feature being especially noticeable below. *Hab.* Salibaboo.

P. telesicles, Feld.—Type of ♀ ab. *leucothoides*, Honr.

P. gyas, Westw.—A gynandromorphous specimen, the left hind wing being male, the remainder female.

P. arctofasciatus, sp. nov. (♂).—Close to *P. pamphylus*, Feld., but may be distinguished by the much narrower median band; the spot between costal and subcostal nervures of hind wing is also much smaller. *Hab.* Sulla Mangola.

P. bathycloides, Honr.—Type. ♂.

P. chiron, Wall.—Type of ab. *chironides*, Honr.

P. milon, Feld.—Type of ab. *milonides*, Honr.

P. sulaensis, sp. nov. (♂).—Near *P. milon*, Feld., but the spots composing median bands of both wings much smaller, and of a more bluish tint. *Hab.* Sulla Mangola.

P. seminiger, Butl.—Type of *ægistiades*, Honr.

P. obliteratus, sp. nov. (♀).—Allied to *P. ligatus*, Rothsch., but may be separated by the four lower discal spots of hind wing being absent above and below, and the streak between second and third median nervules minute; and the submarginal spots below are very much smaller. *Hab.* Rossel Island.

P. neopommeranius, Honr.—Type. ♀.

P. macareus, Godt., ♀ ab. *masformis*, ab. nov.—Differs from typical female in having the following additional whitish markings:—Fore wing: cellular markings as in male; three round spots just beyond cell; five median streaks, and two small spots above first median nervule. Hind wing: cell almost filled; a long wide streak between costal and subcostal nervures; five discal streaks, of which the centre is the smallest, and another long wide streak between median and submedian nervures. *Hab.* Java. The example of this form of the female is, I believe, unique; it was taken by Fruhstorfer, who sent it to the late Ed. G. Honrath, of Berlin, and came into Mr. Adams's possession with the Honrath collection.

P. striatus, sp. nov. (♂).—Allied to *P. indicus*, Rothsch., and *P. macaristus*, Grose Smith. From the former it may be separated by all the pale markings being very much narrower, and the cellular streaks of fore wing being mostly broken up into spots. From the latter it differs in the larger discal markings of the fore wings, and larger discal markings and submarginal lunules of hind wings. *Hab.* Siam. Specimens from Perak belong to *P. indicus*, Rothsch., and not this form.

P. interjectus, Honr.—Type. ♂.

P. ramaceus, Westw.—The series includes type of *P. schönbergianus*, Honr.

P. similis, sp. nov. (♂).—*P. megarus*, Dist. *nec* Westw., Rhop. Malayana, t. xlii. f. 9, pp. 468, 469. Near *P. megarus*, Westw., from which it differs in the much wider cellular and discal markings of the fore wing; while the cell of the fore wing below is marked as above. *Hab.* Perak (type); Siam.

I am indebted to Dr. Karl Jordan for very kindly looking through this paper.

Lynton Villa, Sydney Road, Enfield.

FURTHER NOTES UPON *EMYDIA CRIBRUM.*

By J. Hy. Fowler.

I was most interested in the perusal of the notes on *Emydia cribrum*, by Mr. Bankes (Entom. xxxii. 101–103). This species being one of my favourite insects, I have spent a great deal of time in observing it since I wrote the note referred to (Entom. xxv. 269–271), and can safely say that I know its life-history right through; I have found larvæ several times and know it well. I do not think Mr. Bankes can have read my "Further Observations upon *Emydia cribrum*," in the 'Entomologist' for 1894 (xxvii. 307), and I think they will show that this species has been bred from British larvæ, and the aberration mentioned as apparently unknown to me is represented by a similar one in my cabinet, but it is extremely rare. Mr. Bright, of Bournemouth, has one also, I believe.

I am pleased to add that I have quite recently discovered two things, by the merest accident, in connection with *cribrum*, which will also be likely to clear up two doubtful points, *viz.* its food-plant, and a New Forest locality. I must confess I was agreeably surprised at the event, as I have collected at various times over the same ground scores of times, but not during the time when *cribrum* is upon the wing. I rode my bicycle some miles into the Forest for a spin, dismounted, and strolled over a heath to see what insects were upon the wing. I saw a few of the common species, such as *carpini*, *nanata*, and others; and upon my lying down upon the heath for a rest, I was casually looking around, and upon a clump of lichen close by was a nearly full-grown larva of *cribrum* feeding. I watched it for some time; then brought it home for comparison with my preserved specimens, and found them identical. The lichen was quite different from that which grows upon the heath-stems; this grows upon, and in fact carpets, the ground all about; grows several inches high; in appearance it resembles the well-known lichen which *Cleora glabraria* feeds upon, on oak-trees, &c., but is a little coarser.

I may add that I have well-preserved larvæ, pupæ, ova, and the parasites in my cabinet; also over two dozen of the perfect insect which I bred. A few seasons ago I found five larvæ upon a clump of *Aira cæspitosa*, near Verwood, and bred them through; but to go and collect them upon the heaths is like looking for the proverbial needle in the bundle of hay. The locality in the New Forest which I have discovered is known only to myself, I believe, and I hope to get a good series there during the first week in June. I will publish the results.

Ringwood, Hants: May 4th, 1899.

A GUIDE TO THE STUDY OF BRITISH WATERBUGS (AQUATIC RHYNCHOTA).

By G. W. Kirkaldy.

(Continued from p. 115.)

Velia, Latreille, is closely allied to the preceding genus. There is a single British species, usually known as *V. currens* (Fabr.); as, however, I am unable to distinguish it structurally from *V. rivulorum* (Fabr.), and as no structural differences have, to my knowledge, been mentioned by earlier authors, I record it here as *V. rivulorum* (Fabr.). It has also been described under the names *affinis*, *aquatica*, *aptera*, *impennis*, *major*, and *ventralis!* It is dimorphic, the head and thorax of each form being portrayed on Pl. 1, figs. 1 and 2. The anterior tarsus is shown on fig. 4 (compare with that of *Hydrometra*, f. 5), and the sterna on fig. 3 (compare with the sterna of *Gerris*, f. 11). The apical segments of the venter, in the male, are delineated on fig. 14; in the female they are not very dissimilar from those of the same sex of *Hydroëssa*, except that apical margin of the connexivum of the 6th segment is produced acutely as in the male.

Velia progresses in a very similar manner to *Hydroëssa*; Meinert states* that it also readily moves beneath the surface of the water, in the usual position and also back downwards. It is then encased in a silvery air-bubble, and has very much the appearance of the water-spider [*Argyroneta aquatica* (Linn.)].

Velia rivulorum chooses habitats of a very diversified nature: streams—swift-flowing or slow—seem to form its usual haunts; but it may be found almost everywhere that fresh water occurs—in the swirling pools at the foot of rushing cascades, on stagnant meres, in solitary rock-pools left by the summer contraction of mountain torrents, under stones at (and indeed some little distance from) the margins of lochs and ponds. As has been previously remarked, many of the Gerridæ conceal themselves—in fact, "hybernate"—under moss, stones, &c., often far from water, during the winter. I do not think this has been noticed in the present species; in fact, Fallén records† its occurrence in some numbers (in the apterous form), running about quickly on the water, at a time when snow was lying on the frozen earth. Of course they may, as a rule, hybernate like their allies.

In the British Isles the apterous form is exceedingly common, and well distributed from the Shetland Isles to the southernmost portions of England, and from Lincolnshire to Connemara; the macropterous form is usually very scarce, though occasionally occurring somewhat plentifully.

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* "VandlØberne, Hydrometridæ, deres Færden og Leven" (in Entom. Medd. i. p. 95, 1887), a valuable paper, to which I will refer later at some length.

† Hemipt. Svec. 1829, p. 161; see also Meinert, *l. c.* p. 96, and Reuter, 1888, Ent. Medd. i. pp. 123–4, "Några ord om Hydrometridernas öfvervintring."

Gerris, Fabr., 1794,* is the last gymnokeratous genus with which, for the present, we will be concerned.

The short (compared with that of *Hydrometra*, Latr.) head, the very long mesosternum, and the very long intermediate posterior legs, readily distinguish it from its allies. There are ten British species, forming three well-marked subgenera; the latter are separable as follows:—

1. First segment of antennæ much longer than the second and third together; nearly as long as second, third, and fourth together (Pl. 1, f. 7). [Sixth segment of connexivum produced into a long spine] ... *Aquarius*, Schell.
— First segment subequal to, or slightly shorter than, the second 2
2. Antennæ short, subequal to, or shorter than, head and thorax together (Pl. 1, f. 9); sixth segment angular, not spinose ... *Gerris*, in sp.
— Antennæ long (when turned back reaching to posterior coxæ) (Pl. 1, f. 8); sixth segment produced into a long curved spine *Limnoporus*, Stål.

As the habits of the various species appear to be very similar, the following account (drawn up largely from Meinert's paper, confirmed and extended by one or two other small publications and the few observations I have been able to make) is to be taken as applying to any species, unless specially indicated:—†

While *Hydrometra* and *Hydroëssa* disport themselves almost constantly at the margins of the pond or stream they inhabit, *Gerris* (and, to some extent, *Velia*) venture out into the open, though they hold themselves continually in readiness to dart back to the shelter of the shore.

The legs of *Gerris* are very remarkable. the two hinder pairs being very long, thin, almost thread-like (*filiform*), and destitute of the swimming-hairs which are such a marked feature of the more specialised kryptokeratous forms. Such lengthy appendages would be a serious obstacle to rapid progression in insects habitually moving in the water,[*] but are eminently adapted to insects skimming lightly over the surface. The anterior legs do not seem to be, as states De Geer, usually employed for the capture of prey, though they hold in position the dead insects upon which *Gerris* apparently generally feeds. Meinert states that, although the anterior legs are structurally similar in both sexes, their principal use, in the male sex, is to hold the female firmly during copulation. I have not, however, been able to find, among the males, any specially modified clasping organ, such as obtains in certain Coleoptera.

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* = *Aquarius*, Schell. 1800 = *Hydrometra*, Fabr., 1803 = *Tenagogonus*, Stål, 1868. The word "Gerris" is doubtless a modification of the Latin *Gerres* (see Entom. 1898, p. 103).

† See Meinert, *l. c.* pp. 81–100; Reuter, *l. c.*; De Geer, 1773, 'Mémoires,' iii. pp. 311, *et seq.*; Amyot and Serville, 1843, 'Hémiptères,' pp. 409–23; Amyot, 1846, Ann. Soc. Ent. France; Miall, 1895, Nat. Hist. Aquat. Ins. pp. 349–51.

The normal position of *Gerris* on the water is as follows: the posterior legs slope somewhat backwards, the middle legs sloping strongly forward, so that the tarsi come to rest nearly as far forward as the head, but directed outwards to the side. The anterior legs are nearly perpendicular, the tarsi almost touching at their bases, thence diverging. *Gerris* rests on all six legs, elevated upon them to a considerable height from the surface, all the species, especially the larger kinds in their adult state, depressing the surface of the water, and forming a moderately deep oval "bowl" or "dimple" for each leg. The length, or larger diameter, of each dimple is proportionate to the length of that portion of the leg wherewith they rest on the water, *viz.* to the length of the tarsi in the case of the anterior and intermediate legs, and to the length of the tibiæ and tarsi in the posterior legs. The width, or smaller diameter, is half that of the larger diameter.

Movements are of three kinds—(1) drifting or floating, (2) skating or rowing, and (3) leaping.

In the drifting or passive movement the bug is carried forward on flowing water, and even on stagnant ponds, by the undulating ripples caused by puffs of wind.

The commonest of the active movements is that by which the bugs do not lift themselves from the surface of the water by means of their legs, but make a few strong synchronous strokes with the intermediate pair of legs; while the anterior and posterior pairs are quiescent, or move so feebly that the motion can be observed only with difficulty. A proof of the fact that the legs are not upraised from the water is that the dimples wherein they stand retain their form and size, as may be seen clearly both in nature and in captivity. When the bug stands on the surface of a shallow sandy pool (or a glass vessel with a sandy bottom) in the sunshine, the dimples throw shadows on to the bottom, each surrounded by a bright ring, caused by the refraction of those rays which pass through the curved surface. The central shadow thrown by the body is not surrounded, however, by a bright ring, and so, when the bug moves, no bright ripples appear about the central shadow, such as accompany the movements of the legs.

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[*] *Cf.* the short stout posterior legs of *Notonecta*, *Corixa*, and *Dytiscus*, &c.

Gerris can also, by a powerful stroke of one of the intermediate legs, perform side-movements with perfect ease, and even turn right round, executing strategic movements to the rear with great agility.

The other active movement is the leaping, whereby the bugs tear themselves loose from the surface of the water and make a spring up into the air. According to Meinert, *G. lacustris* (Linn.), Stål, can leap a couple of inches on the water, but on dry land it exceeds this to some extent, springing to a greater height, with increased rapidity, and with more continuous movement; one often finds on a hunting excursion that these bugs can leap right out of the net.

Gerris does not, as a rule, voluntarily enter beneath the surface of the water, but it is evident that its usual position must expose it to the frequent danger of being overwhelmed by sudden squalls, or other disturbances, and swamped. The short, close, velvety pubescence with which they are usually almost completely covered forms—if it be in good and clean condition—an investment well-nigh impervious to water,* and they are thus able to rise to the surface unharmed, breaking the surface-film † with some little degree of effort.

(To be continued.)

NOTES ON AMERICAN BEES.

By T. D. A. Cockerell,
Professor of Entomology, New Mexico Agricultural College.

(Concluded from p. 129.)

Colletes nautlanus, n. sp.

♀. Length about 9½ millim., rather broad and compact, shining black. Head broader than long, inner orbital margins quite strongly concave; face with short white pubescence, rather dense and strongly plumose at the sides; clypeus with rather strong punctures, more or less running into striæ; vertex with sparse punctures of two sizes; many black, strongly plumose hairs behind ocelli; cheeks with white pubescence; antennæ short, entirely black, scape punctured; clypeus

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* The elytra are provided with short close hairs along the nervures, but, despite this, they are apt to become soaked and unmanageable when swamped with water; and this is one of the reasons why I have considered (*ante*, p. 109) that apterous forms will tend to supplant the others. In some macropterous and brachypterous individuals I have examined, pubescence is scarcely developed at all on the dorsal surface of the abdomen.

† See Miall, *l. c.* pp. 12–15; Scourfield, 1894, in Journ. Linn. Soc. Lond. xxv. pp. 1–19, Pl. 1 & 2.

with the anterior margin not emarginate; labrum with a row of weak pits; apical portion of mandibles dark reddish; space between base of mandible and eye very short, almost reduced to nothing; mesothorax with large and very strong punctures, dense in front, less so behind, hind part of disc without punctures; scutellum impunctate in front, with large punctures behind; post-scutellum coarsely roughened; basal enclosure of metathorax narrow, bounded by a sharp rim, and crossed at intervals by sharp ridges; posterior face roughened, almost malleate; pleura with very dense large punctures; prothoracic spine long and sharp; pubescence of thorax white at sides, dense on tubercles and on sides of metathorax, black just beneath the tegulæ, on dorsum thin but strongly plumose, black mixed with greyish white, the white conspicuous at the suture between mesothorax and scutellum, and (greyish) on post-scutellum, the black most conspicuous on the scutellum; tegulæ shining piceous; wings hyaline, nervures and stigma black; stigma small, marginal cell with an appendicular nervure, second submarginal cell about as long as third, third narrowed about one-half to marginal, second recurrent nervure strongly bent; legs with white pubescence; hind femora with an abundant, white, beautifully plumose floccus; second joint of hind tarsi triangular; abdomen broad, very shiny, minutely but strongly and quite closely punctured, except on anterior part of disc of first segment; segments nude, except very narrow snow-white apical bands, and white hair at base and sides of first segment, and a few scattered black hairs on the apical segments; venter with a very thin hoary pubescence.

Hab. San Rafael, on the Rio Nautla, State of Vera Cruz, Mexico, last of June. (*C. H. T. Townsend.*) This has less black hair than *C. æthiops*, and the abdomen is not "rapidly narrowed to apex." It has no trace of the dense ochraceous pubescence found on the breast of *C. mexicanus*. Curiously, *C. nautlanus* has a very strong resemblance to *C. nudus*, Rob., from Illinois, differing, however, by the shining and closely punctured abdomen.

Colletes gilensis, Ckll.—♂. Prude's Summit, White Mountains, N. M., July 29th, 1898. (*C. M. Barber.*) Prude's Summit is not on the maps; it is the top of the divide between Ruidoso and Mescalero.

Colletes bigeloviæ, Ckll.—♀. Prude's Summit, White Mountains, N. M., July 29th, 1898. (*C. M. Barber.*) My original types were badly worn; a new specimen, in excellent condition, has a shiny black abdomen, with very distinct but narrow snow-white bands on the apical margins of the segments, interrupted in the middle on the first. The punctures of the abdomen are very much smaller than in *C. gilensis*. The third discoidal cell is much less bulging at its end than in *C. nautlanus*.

Nomada edwardsii, Cresson, 1878.—Mr. T. Kincaid sends me eighteen specimens; three from Seattle, Wash.—two males, May 13th, one female, May 17th, 1896; the rest from Olympia, Wash., May 11th and 23rd, and June 24th—mostly females. Cresson's description, though stated to be of a male, applies to the female. The male has the mesothorax all black, the scutellum with only a pair of yellow spots, the post-scutellum black, the yellow spots on metathorax smaller, and the black bands on the abdomen broader. The basal portions of the legs are largely black, where in the male of *N. superba* they are red. The flagellum of male *edwardsii* is black above and red beneath, and this is the only red about the insect.

Nomada maculata, Cresson, 1863.—Mr. T. Kincaid takes at Seattle and Olympia, Wash., May 23rd–June 25th (the last date being that of a Seattle male), a species which agrees with *maculata*, but is 10 millim. long or slightly over. Robertson, in Illinois, found the insect to not exceed 8 millim. in either sex; but I have a female from Franklinville, Pa., May 19th, identified as *maculata* by Mr. Fox, which is quite as large as the Washington form. The mandibles are bidentate, and the last abdominal segment in the male is bifid, as Robertson indicates.

Sphecodes dichrous, Smith, 1853.—Mr. T. Kincaid sends me very numerous examples from Olympia, Wash., mostly taken in June, the dates running from May 25th to July 2nd; also a few from Seattle, Wash., one as early as April 17th; also one or two from Pasco, Wash., May 25th; and a somewhat larger and darker individual (female) from Comano I., Wash., collected by N. L. Gardner, May 25th, 1896. It would be interesting to ascertain whether the Comano I. specimens are uniformly of rather large size and dark colour, constituting a local race.

Bombus nevadensis, Cress.—Mescalero, Indian Agency, N. M. (*Otis*).*

Bombus ternarius, Say.—One from Seattle, Wash., April 3rd, 1897. (*T. Kincaid.*) The pubescence of the head is mostly black.

Bombus sonarus, Say.—Forks of Ruidoso Creek, N. M., July 30th. (*C. M. Barber.*) Also taken by Prof. C. H. T. Townsend. New to the United States.

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* The Mescalero Indian Agency, on Tularosa Creek, N. M., is an interesting locality for bees. In addition to the species mentioned in the body of this article, Mr. C. M. Barber took the following at the Agency in July, 1898:—*Sphecodes mandibularis*, Cress., *Agapostemon texanus*, Cress., *Halictus ruidosensis*, Ckll., *H. forbesi*, Rob., *H. meliloti*, Ckll., *H. perdifficilis*, Ckll., *H. ligatus*, Say, *Andrena apacheorum*, Ckll., *Prosapis tridentula*, Ckll., *Heriades carinata*, Cress., *Melecta miranda*, Fox (about nests of *Podalirius occidentalis*, on which it is evidently parasitic), *Podalirius occidentalis*, Cress., *P. cardui*, Ckll. (the second specimen known), *Megachile fortis*, Cress., *M. fidelis*, Cress., *M. pugnata*, Say, *Anthidium maculosum*, Cress., *Osmia faceta*, Cress. (new to N. M.), *Melissodes crenulaticornis*, Ckll., *M. tristis*, Ckll., *Xenoglossa pruinosa*, Say, *Clisodon terminalis*, Cress., *Monumetha borealis*, Cress., *Bombus marrisoni*, Cress., *Apis mellifera*, L.

Bombus fervidus, Fabr. – Three from Pasco, Wash., May 25th, 1896. (*T. Kincaid*)

Psithyrus cevalliæ, n. sp.

♂. Length 18–22 millim., black, with yellow and black pubescence. Antennæ entirely black, about 10 millim. long, first two joints of flagellum short and equal, each about two-thirds the length of the third; orbits parallel, facial quadrangle somewhat longer than broad; front and vertex quite densely punctured, but a shining impunctate area on each side of the ocelli, which are placed in a gentle curve; pubescence of head black, mixed with pale grey on the face, especially on the clypeus; thorax above with a broad black band between the wings, all before this band is yellow, behind it is yellow mixed with black; pleura extremely densely punctured, with long black hair more or less mixed with dull white; wings fuliginous; legs black, anterior femora with black hair, middle femora with black hair in front and long yellowish-white hair behind, hind femora with sordid yellowish hair, short and black underneath at base; tibiæ and tarsi with short black pubescence on the outer side, and pale reddish on the inner; first five segments of abdomen clothed with mustard-coloured hair, sixth with black, apex with shining orange-ferruginous; venter with sparse short black hair, some pale along the margins of the segments; claws very deeply cleft.

Hab. East of Las Cruces, New Mexico, in the *Larrea*-zone, Aug. 23rd, at flowers of *Cevallia sinuata*, two males taken, others seen, by C. H. T. Townsend and the present writer. On Nov. 10th I took a specimen at Mesilla Park, N. M., at flowers of *Aster canescens* var. *viscosus;* this differs in having the metathoracic pubescence almost all black, except a yellow tuft just behind the wings, and the hair of the apex of the abdomen black.

This is certainly a true *Psithyrus*, but it closely resembles the so-called *Apathus elatus*, which is the male of *Bombus fervidus.*

This is the only *Psithyrus* I have ever found in southern New Mexico. *P. variabilis* (Cress.), described from Texas, extends thence northward; I have specimens of it from Stillwater, Oklahoma, at flowers of *Prunus americana* (coll. *C. E. Regnier*, com. *E. E. Bogue*), and Baldwin, Kansas (*J. C. Bridwell*). I have a single small male of *variabilis* from Tuerto Mountain, near Santa Fé, New Mexico, at an altitude of 8200 ft., Aug. 7th, at flowers of *Senecio* (*Ckll.* 4313); this has yellow hair on the anterior part of the pleura, black on the hinder part, and a patch of yellow hair on the front.

Melissodes obliqua, Say. — Mesilla, N. M., July, 1898; many specimens. (*C. M. Barber.*)

Melissodes crenulaticornis, Ckll.—What I take to be the female of this species was found by Mr. C. M. Barber at the Forks of Ruidoso Creek, N. M., July 30th, 1898. In my table of N. M. *Melissodes* (female) it runs at once to *M. gilensis;* but it differs from that in being smaller (length 10 millim.), no black hair on vertex, flagellum wholly black, dark hair of mesothorax and scutellum dark brown instead of black, stigma less developed and piceous, bases of third and fourth abdominal segments with scanty hair which is entirely black, apical bands of pubescence on second to fourth segments white and well-defined. The hair of the last two abdominal segments is black, except at the extreme sides, and the brush of the hind tarsi is orange-fulvous.

This female is referred to *crenulaticornis* instead of to *ruidosensis*, on account of its small size, and also because the venation is as in the former species, whereas *ruidosensis* has a much larger second submarginal cell.

Alcidamea simplex (Cresson).—This is the *Heriades simplex*, Cress., and the *Alcidamea producta*, Cress., the former specific name having priority.

Megachile relativa, Cresson, 1878.—One female. Forks of Ruidoso Creek, N. M., July 30th, 1898. (*C. M. Barber.*) New to New Mexico.

Megachile wootoni subsp. *calogaster* (Ckll.).—When describing *M. calogaster* I omitted to notice the close resemblance between its male and that of *M. wootoni;* they may be separated thus:—

Spurs of hind tibiæ ferruginous; vertex more closely punctured . . . . *wootoni.*
Spurs of hind tibiæ piceous; vertex less closely punctured . . . . *calogaster.*

The two are doubtless geographical races of one well-marked species.

Megachile sidalceæ, Ckll.—A female was taken by Mr. C. M. Barber in Mesilla, N. M., July 4th, 1898. It resembles the male except in the usual sexual characters. The face has short white hair instead of a dense pale yellow brush; the ventral scopa is white, with a few black hairs at the extreme tip.

Megachile casadæ, Ckll.—Mr. C. M. Barber took a female in Mesilla, N. M., July 4th, 1898. It resembles the male except in the usual sexual characters. The ventral scopa is white, even to the tip.

Megachile fidelis, Cr., var. n. *concinnula.*

♂. Length about 9½ millim., black, with thin dull white pubescence. Head large, a little broader than thorax, eyes mottled, facial quadrangle a little longer than broad, narrowing below; face, including clypeus, densely covered with yellowish-white hair; vertex dull, strongly punctured, with erect hairs, some of which in certain lights seem black, but this is deceptive; cheeks with thin white pubescence, a dense tuft behind near base, but the area above the base of mandibles is hairless; antennæ black, last joint not broadened; mandibles striato-punctate, black, fringed beneath with orange-fulvous hair; a tooth behind mandibles; mesothorax and scutellum dull, with numerous shallow punctures, thinly clothed with erect dull white hair; no bands of pubescence at sutures; tegulæ piceous; wings dusky, darkest at apex, nervures brown, second submarginal cell receiving first recurrent nervure almost at its extreme base, and the second very near its apex; legs black, pubescence on femora white, on tibiæ short, thin, and fulvous; spurs light ferruginous; the four hind tarsi ordinary, the pubescence on inner side of hindmost strongly orange-fulvous; anterior femora ordinary, black, with long white hairs; anterior tibiæ black, with a short sharp spine at apex; anterior tarsi honey-colour inclining to ferruginous, last joint and apical half of the one before fuscous; first joint deeply hollowed, canoe-shaped, produced and somewhat curved at end, its rounded apex resembling a finger-tip; inner margin of the hollow with a continuous fringe of short black hairs, outer margin darkened, but having only fulvous hairs; hind margin with the usual long fringe of white hairs, none of which are black at ends; second and third joints flattened, with a conspicuous dark spot beneath; fourth joint simple; anterior coxæ with a long spine, no patch of bright hair near its base; middle coxæ unarmed; abdomen short, well punctured, with rather long thin dull white hair on basal segment above and beneath, but not at sides, and more or less on sides of ventral segments to the apex; hind margins of second to fourth dorsal segments with a narrow yellowish hair-band, very well defined; last segment concave in the middle, its margin with a deep but rather narrow emargination, the margin on each side of this minutely denticulate; the subapical ventral teeth obsolete.

Hab. Colorado Springs, Colorado, middle of July. (*Ckll.* 3558.) Differs from *fidelis* in the face being more narrowed below and the venation. Mr. Fox has also seen this variety from California.

Mesilla Park, New Mexico, U.S.A.

THE GENUS *LEUCERONIA* OF AURIVILLIUS.

By A. G. Butler, Ph.D.

In a paper upon the African genera of Pieridæ (Ent. Tidskr. 1895, p. 256), Prof. Aurivillius places *Teracolus* next to his new genus *Leuceronia*, under a section having only eleven veins to the front wings. Had the author consulted a paper which I wrote some years previously, "On the inconstancy of a generic character in *Nepheronia arabica*" (Ent. Mo. Mag. 1886, p. 259) he would have discovered that the eleven-vein peculiarity which exists in some examples of *L. buquetii* and its racial or seasonal forms was altogether abnormal.

In typical *L. buquetii*, with the heaviest black borders to the primaries, I find decidedly more examples with twelve than with eleven veins; in the slightly narrower bordered Arabian form there are more examples with eleven than with twelve veins; in all the South African forms, whether broadly bordered, narrowly bordered, or without borders, I have found twelve veins.

I note, however, that vein 11 (the first subcostal branch), whenever present in *L. buquetii* and its forms, is anastomosed for a short distance with vein 12 (the costal vein); yet this anastomosis would seem to be of recent date, inasmuch as, when examined with the wing facing the light, both veins seem to exist separately, the culmen of each vein being apparently indicated. When damped with benzine and held between the eye and the light the anastomosis appears to be normal, the ridges not being visible. In some examples only a portion of vein 11 is present.

Prof. Aurivillius gives a second character by which he distinguishes his genus *Leuceronia*, viz.:—"Veins 8 and 9 out of 6, 10 only free from the discoidal cell."

This is probably a misprint for "veins 8 and 9 out of 7," because, if veins 8 and 9 forked from 6, it would be difficult to account for vein 7. One might imagine that veins 6 and 7 coalesced throughout, but in such case the learned Professor would have had to describe his genus as possessing ten veins only; whilst it would be impossible to assert positively that vein 7 (rather than 6) had disappeared.

Apart from the anastomosis of vein 11 with 12, there is nothing to distinguish *L. buquetii* generically from *Eronia argia*, and, as this anastomosis necessarily disappears entirely where vein 11 is not present, it may be questioned whether the *argia* group ought to be excluded from *Leuceronia*. I think not. As to whether these forms should be considered distinct from *Eronia*, I think, matters little; they have a very different aspect.

THE ENTOMOLOGICAL CLUB.

A short account of this Club was given in the 'Entomologist' for 1892 (xxv. pp. 4–9), and it was then mentioned that a certain portion of the archives were missing. Recently, we are happy to say, a minute-book, with a small account-book, have been discovered, and it is now therefore possible to furnish some items of information that were not available when the aforesaid brief history of this venerable institution was penned.

Turning first of all to the cash-book, we find that although it is simply a small volume of thirty-six leaves, it contains particulars of receipts and expenditure during thirty-eight years (*i.e.* from 1836 to 1874), and many of the pages are still blank.

As has been already remarked, this Club, since it was founded in 1826, has been conducted without entrance-fees or subscriptions. Funds for the purposes of the Club were supplied by members and hon. members in the form of voluntary contributions. In 1836, for example, the donations amounted to the sum of fifty-two pounds (eight donors), and the greater part of this amount was expended during the year in boxes and part payment of a cabinet. As the requirements of the Club grew less, so the cash contributions fell off, until in 1874 (the last entry) the year opens with a balance of eight shillings and fourpence, and this was increased by a whip round to thirty-three shillings and fourpence, so that the Secretary's "little bill" might be settled and a small amount remain in hand against contingencies.

The recovered minute-book records the doings of the Club from October 21st, 1841, to November 12th, 1851, and we here note that in the first-named year the property of the Club was insured to the value of £700. The general collection at this time was located in the dwelling of Mr. Newman, at Peckham, and the other effects at Mr. Walker's house at Southgate.

In March, 1842, Mr. Hanson presented the Club with some valuable insects from Smyrna; a collection of minute British Coleoptera was also presented by Mr. S. Stevens.

At a meeting held in October, 1843, Mr. Newman intimated his intention of resigning the office of Curator, and Mr. Doubleday gave notice that at the next meeting he would submit the following proposition:—

"That on the appointment of a new Curator, the preservation and completion of the British Collection belonging to the Club shall be considered a special and primary object of its members; and that as the Foreign Collection cannot without great expense be brought to a state of even tolerable completeness, and as great difficulties lie in the way of its preservation, it is desirable that it should be disposed of in the manner most advantageous to the interests of the Club and of Entomology.

"That with this view, after allowing (in accordance with the fourth rule) donors to reclaim such of their respective donations as they may think fit, those specimens which may be desiderata to the collection of the British Museum be presented to the Trustees of that Institution, on the understanding that the Club shall receive from them a return of such specimens from among their duplicates of British insects as may be desiderata to the Club's collection.

"That the remainder of the Foreign Collection, and such boxes as may not be needed for the use of the Club, be then disposed of by sale, in the manner that may be deemed most advisable; and that the produce of the sale be applied, in the first place, to the purchase of an additional cabinet for the British Collection, and, secondly, to the increase of that collection, so that it may become what it was originally intended to be, valuable as 'a model named-collection of insects unquestionably British.'"

The foregoing resolution was brought forward by Mr. Doubleday at a meeting held at his residence on Nov. 16th, 1843, and, after the paragraph referring to "duplicates of British insects" had been reworded so as to include foreign examples of species reputed to be British, was carried without dissent. A Committee was then appointed to deal with the selection of specimens for the National Museum, the question of disposing of the remainder of the foreign insects being postponed for a future meeting to consider.

At a meeting held in December, 1843, it was decided to request members wishing to obtain the return of insects given to the Club to send the Secretary notice to that effect, together with particulars; but, according to the report of the Selection Committee, which was presented on Feb. 15th, 1844, it would seem that some members had thought that the result of the proceedings at the meeting held in the previous November warranted them in acting at once, and they had therefore secured possession of the insects which they had presented to the Club.

The foreign insects having been deposited at the British Museum to "enable the officers of that establishment to make a selection," it appears that they did so, as the Report continues:—

> "That they have since set apart, and deposited in nine large boxes, all such as they consider (on a liberal construction of the word) to be desiderata to the public collection, and which will form a handsome and acceptable addition thereto, being generally in good condition, many of them rare, and including a considerable number of authenticated typical specimens of insects first described by Mr. Newman.
>
> "That they have properly limited themselves to as small a number as is required to illustrate each species in those cases where the Club collection contained many specimens. The total number of specimens set apart by them appears by Mr. Doubleday's statement to be upwards of 5700.
>
> "That Mr. Gray is prepared to recommend to the Trustees of the Museum to present to the Club, from amongst the duplicates of British and reputed British insects in the public collection, specimens of all such as are desiderata to the Club. The Committee had not any means of judging how far this may extend, but Mr. Doubleday is of opinion that some few truly native specimens of great rarity may be so obtained, although no idea of the number of the reputed British insects can be formed until the whole of their general collection shall have been examined.
>
> "No portion of the selected insects are at present appropriated to the Museum, but the whole await the final determination of the Club.
>
> "It appears that among the selected insects there are about one hundred species of Coleoptera, collected by Messrs. Doubleday and Foster in North America, which the former gentleman wishes to send to Dr. Harris at Boston, U.S., for examination by him, and it will probably be thought desirable that these should not be given up to the Museum until they may be returned from Dr. Harris.

"The remainder of the Foreign Collection is at present dispersed through eighteen drawers and one hundred and twelve boxes, and contain a very considerable number of fine insects, generally in good condition, although many of them are affected by mouldness which it might be desirable should be (as far as practicable) removed before measures are taken for disposing of them. The Committee do not think it necessary at present to offer any estimate of the number remaining, as that may probably be left until the Club may have decided as to their disposal. It must, however, be observed that the boxes are throughout interspersed with reputed, or recorded (although doubtful), British species, which, in accordance with the resolutions of the 16th November, should be carefully selected and removed to the Curator."

The Report then deals with the drawers and boxes, of which there seems to have been over one hundred and thirty; eighteen of the former and forty-one of the latter were stated to belong to Messrs. Walker, Newman, and others, "and of course held at their disposal. Of the remaining seventy-four boxes which belong to the Club, seventy-two are mahogany, double-corked boxes of uniform make and size, about 18 by 12 in., and are said to have cost, when new, eleven shillings each." It may be observed here that forty-two boxes were purchased by the Club in 1836, at a cost of £23 11s.; twelve others in 1837, at half a guinea each. In 1838, £10 0s. 6d. was paid for boxes.

Following the reading of the Report, from which the above extracts have been made, it was resolved—

"That the several suggestions contained in the Report should be adopted."

"That the insects which have been selected be presented by the Secretary, in the name of the Club, to the Trustees of the British Museum.

"That the remainder of the foreign collection (after the removal of the reputed British insects) be sold without reserve, and with as little delay as possible, by auction at the rooms of Messrs. Stevens."

"That some person be employed (previously to their removal) to clean and in some degree to arrange them, and in concert with the auctioneers to lot them."

"That thirty-six of the best of the boxes be retained for the future use of the Club, and that the remainder of them be included in the sale."

"That Mr. Newman, Mr. Doubleday, Mr. Walton, and Mr. Marshall are appointed a Committee to carry these resolutions into effect, with full power to act in the business as they may think proper."

The sale took place on the 2nd and 3rd days of May, 1844, and on May 16th the members of the Club met at the residence of Mr. Hanson, when a marked catalogue of the sale of the Club's collection was placed on the table, and the announcement made that the sum realised was £58 3s. 6d., from which duty and expenses amounting to £14 5s. had to be deducted, leaving a balance of £43 18s. 6d.

It was decided at this meeting that the British collection, the cabinets, books, and other property of the Club should be henceforth insured for the sum of £300 only instead of £700.

(To be continued.)

NOTES AND OBSERVATIONS.

The Lepidoptera of the London District.—I have undertaken to edit and bring up to date the list of the London District Lepidopterous Fauna, commenced a few years ago by Dr. F. J. Buckell, and which is now about to be published by the City of London Entomological and Natural History Society. I shall be glad if those entomologists who assisted Dr. Buckell will kindly furnish me with any recent additions; and shall also be thankful for the assistance of any other entomologists who may be able to add further records from their own personal knowledge. The district comprises roughly a ten-mile radius from Charing Cross. I shall be pleased to give more exact information in answer to inquiries.—Louis B. Prout; 246, Richmond Road, N.E., May 20th, 1899.

The Coccidæ of the Sandwich Islands.—I have just come across a pamphlet by Mr. A. Koebele, entitled "Report of the Entomologist of the Hawaiian Government," published in 1898. In it the following Coccidæ are mentioned which are new to the Sandwich Islands list (*cf.* Entom. xxxi. 239; xxxii. 93):—*Dactylopius calceolariæ*, Mask.; *D. adonidum*, L. (but is probably *citri*); *Eriococcus araucariæ*, Mask.; *Ceroplastes ceriferus*, Anders., and *C. floridensis*, Comst. (these two often introduced, but not established); *Lecanium hemisphæricum*, Targ.; *L. mori*, Sign.; *L. tessellatum*, Sign.; *Parlatoria zizyphus*, Luc.; *P. proteus* var. *pergandei*, Comst.; *Mytilaspis beckii*, E. Newman (*M. citricola*, Pack.); *Aspidiotus rapax*, Comst.; *A. duplex*, Ckll. There are also mentioned two unidentified species of *Pulvinaria*.—T. D. A. Cockerell.

Insects and Fungi.—Entomologists are all doubtless well acquainted with the experiments that have been made with a view to the extirpation (or, at least, diminution in numbers) of certain insect pests by means of various fungi. As an example may be taken the chinch bug, *Blissus leucopterus* (Say), whose ravages are so dreaded in many parts of North America.

The fungi (*Sporotrichum*) are presumed to enter the bodies of the insects through the stigmata, and by their growth in the interior to destroy the life of the attacked bugs, then pushing through to the outside, where the spores are developed. The presence of these fungi is known by the grey powder (not to be confounded with ordinary white mould), which often completely covers the dead bugs.

For the details of the manner in which the disease is spread by human agency, I would refer the reader to the Nineteenth Report of the Illinois State Entomologist, 1895, pp. 5–189, plates ii–xi; "The Chinch Bug," by F. M. Webster (Fifteenth 'Bulletin,' New Series, U. S. Dept. Agriculture, 1898, pp. 1–82); and "The Chinch-bug," by

H. Garman (Seventy-fourth 'Bulletin,' Kentucky Agric. Exper. Sta., 1898, pp. 45–70, figs. 2–8), as being perhaps the most comprehensive and accessible of the already enormous mass of literature on the subject.

M. Künckel d'Herculais has quite recently published (1899, C. R. Acad. Sci., Paris, cxxviii. pp. 620–2) some interesting notes relating to this fungus attack.

In attempting to infect the nymphs of a grasshopper (*Schistocerca peregrina*, Ol.) with the spores of a fungus discovered on the imago, M. d'Herculais found that repeated moultings (every eight days) made the fixation of spores on the integument a matter of great difficulty. When one reflects that in moulting even the internal lining of the tracheæ is cast, it is evident that ecdysis must be an important factor in insect economy as an effective riddance from parasites.—G. W. Kirkaldy.

Tan-pit Liquor attractive to Moths.—Last year I went over a large tan-yard. While walking about between the pits I noticed that in every one of them there were many Geometers and Noctuæ floating upon the surface of the liquor. Now, as this liquor contains the essence of oak bark, &c., I feel confident that if collectors would procure good liquor, and use it in the same way that we do treacle, it would be an excellent attraction. Collectors can but try, and publish results.—J. Hy. Fowler; Poulner, Ringwood, Hants.

Diptera of Scotland.—Under the title "Diptera Scotica," Mr. Percy H. Grimshaw, in the 'Annals of Scottish Natural History' for April, commences a list of the Diptera found in Perthshire. In the first instalment nineteen families and one hundred and twenty-three species are referred to.

Coleoptera of Suffolk.—Mr. Claude Morley, author of "A List of the Hymenoptera-Aculeata of the Ipswich District" (Entom. xxxi. pp. 12–17 and 38–41), has just published a most useful annotated list of Coleoptera found in Suffolk. This work is further referred to under "Recent Literature."

Cannibalism of Arctia villica Larvæ.—Some larvæ of *Arctia villica* which I was rearing last spring, although plentifully supplied with food, exhibited cannibalistic tendencies. Some of their number made no cocoon, but assumed the pupal form on the bottom of the box. When these had cast off their larval skin, and before the pupal envelope had hardened, they seemed to offer an irresistible temptation to their companions' appetites, and while thus helpless were partly devoured by them.—Albert May; Hayling Island.

CAPTURES AND FIELD REPORTS.

Captures at Sallow-bloom near Coventry.—As I have not seen any record of captures at sallow-bloom in this neighbourhood in the 'Entomologist' of recent years, I send the following notes:—From April 1st to 22nd I visited some sallow-bushes between Kenilworth and Stone-leigh almost every evening, and I was rewarded by taking the following:—Fine series of *Tæniocampa gothica*, *T. stabilis*, and *T. pulverulenta* (*cruda*); only ten specimens of *T. incerta* (*instabilis*); twenty *Pachnobia rubricosa* in very fine condition; four *T. opima*, two *T. munda*, one *Cerastis pistacina*, and six *Anticlea badiata*. The nights were, as a rule, rather cold.—E. A. Laxon; Verecroft, Coventry, May 5th, 1899.

Lophopteryx carmelita at Walton-on-Thames.—On May 6th I took a specimen of *L. carmelita* on a fence, close to the ground, at Walton-on-Thames.—C. N. Hughes; 36, Compayne Gardens, South Hampstead, N.W., May 8th, 1899.

Collecting in Gloucestershire, 1898. — Nothing was done in January and February, but on March 4th one *Anticlea badiata* was taken. On March 13th one female *Amphidasys strataria* was found at rest on an oak. On the 14th the sallow was searched, but only being partially out no Noctuæ were seen. An excursion to the sallow on the 16th yielded two *Anticlea badiata*, two *Hybernia marginaria*, and one *Tæniocampa gothica*; while three *H. marginaria*, and five *Anisopteryx æscularia* were boxed off the gas-lamps. On the 30th, at sallow, one *Tæniocampa populeti*, one *T. munda*, one *T. gothica*, one *Scopelosoma satellitia*, and one *A. badiata* were observed.

On April 3rd a visit to the woods resulted in the capture of two *Brephos parthenias*, two male *A. strataria*, one *Xylocampa areola*, and one *Asphalia flavicornis*. This last was found on a small oak about the thickness of a walking-stick. It was so restless in the box in which it was conveyed home that it was practically useless as a specimen. This species evidently will not travel quietly when boxed. During this month *A. badiata*, *Selenia bilunaria*, *Tæniocampa gracilis*, *T. munda*, *T. populeti*, *Xylina ornithopus* (hybernated), *Tæniocampa miniosa*, *Calocampa exoleta* (hybernated), *Vanessa c-album* (hybernated), *Gonopteryx rhamni* (hybernated), *Vanessa urticæ* (hybernated), *Hemerophila abruptaria*, *Tæniocampa instabilis*, *Tephrosia crepuscularia*, *Pieris rapæ*, *Vanessa io* (hybernated), *Triphosa dubitata*, *Tephrosia consonaria*, *Drepana binaria*, *Euchloë cardamines*, *Demas coryli* (at rest on a small beech), and *Pararge egeria* were also seen.

The following were observed during May:—*Anticlea nigrofasciaria*, *Melanippe fluctuata*, *Eucosmia certata*, *Cidaria suffumata*, *Cilix glaucata*, *Eupithecia albipunctata*, *Macroglossa bombyliformis* (narrow bordered), *Thecla rubi*, *Eupithecia vulgata*, *Spilosoma lubricipeda*, *Euchelia jacobææ*, *Arctia mendica*, *Tephrosia punctularia*, *Asthena candidata*, *Acidalia remutaria*, *Lomaspilis marginata*, *Coremia designata*, *Melanippe montanata*, *Eurymene dolobraria* (at rest on oak), *Hepialus lupulinus*, *Heliaca tenebrata*, *Drepana cultraria*, *Lobophora halterata* (at rest on aspen), *Spilosoma menthastri*, *Cidaria corylata*, *Bapta temerata*, *Iodis lactearia*, and *Numeria pulveraria*.

The captures in June included *Rumia luteolata*, *Melanippe sociata*, *Eupisteria obliterata*, *Zonosoma linearia*, *Lycæna bellargus*, *L. astrarche*, *Phytometra viridaria*, *Ino geryon*, *Nemeophila plantaginis*, *Argynnis euphrosyne*, *Sesia tipuliformis*, *Trochilium crabroniformis*, and *Odonestis potatoria*.

During July, *Nudaria mundana*, *Melanargia galatea*, *Thecla w-album*, *Arctia caia*, *Agrotis exclamationis*, *Caradrina morpheus*, *Cidaria fulvata*, *Larentia viridaria*, *Xylophasia monoglypha*, *Plusia gamma*, *Abraxas grossu-

lariata, and *Eugonia quercinaria* were the only species observed, owing to cricket and other attractions.

During August nothing was done, but in September *Xylina ornithopus* and *Agriopis aprilina* were taken.

In October *Miselia oxyacanthæ*, *Orthosia lota*, *Phlogophora meticulosa*, and *Anchocelis pistacina* were taken on the ivy.

Some of my November captures have been already recorded in the 'Entomologist' (xxxii. 19), and in addition I may mention *Cidaria miata*, *Cheimatobia brumata*, *Pœcilocampa populi*, and *Oporabia dilutata*.

On Dec. 12th fourteen *P. populi* and one *Hybernia defoliaria* were taken off the gas-lamps. The same method of capture yielded on the next evening three *P. populi* and one *H. defoliaria*. On the 17th four more *P. populi* and one *H. defoliaria* were the result of an evening's lamping.

To sum up, I consider the season was a very fair average one here, but, owing to pressure of business and other causes, I was unable to devote as much time as usual to collecting, as otherwise I have little doubt my list would have been much longer.—C. Granville Clutterbuck; 1, Spa Villas, Gloucester, May 16th, 1899.

SOCIETIES.

Entomological Society of London.—*May 3rd*, 1899.—Mr. R. McLachlan, F.R.S., in the chair. Dr. A. L. Bennett exhibited various insects which he had collected in the French Congo. They included a species of Mantidæ remarkable for its very striking resemblance in coloration to a piece of bark. Mr. F. Enoch exhibited a living specimen of *Nepa cinerea* infested with a number of minute red *acari* on the ventral surface of the abdomen. He also showed eggs of *Nepa* and *Notonecta* lying *in situ* in decayed leaf-stalks of *Alisma*, and described the mode of oviposition as observed by himself in both of these genera. He then exhibited a living example of the remarkable aquatic Hymenopteron, *Prestwichia aquatica*, Lubb., and said it was one of a brood of nine, including eight females and one male, that issued on May 1st from a single egg of *Colymbetes* found on September 5th, 1898. Mr. Merrifield showed some specimens of *Hemaris bombyliformis*, Esp., with the scales still covering the central portions of the wings. He said these scales, which are present immediately after the emergence of the insect but soon become detached, may be rendered adherent by allowing a very weak solution of indiarubber in benzoline to run over the wings. Mr. C. H. Dolby-Tyler communicated a paper on "The development of *Ceroplastes roseatus*, Towns. and Cockl."—J. J. Walker and C. J. Gahan, *Hon. Secs.*

RECENT LITERATURE.

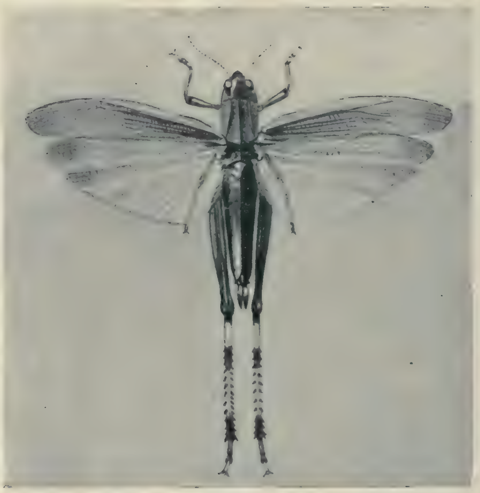
Proceedings of the South London Entomological and Natural History Society for 1898. Part II. Hibernia Chambers, London Bridge. April, 1899.

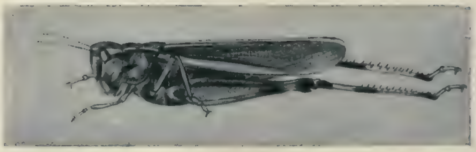
This contains a hundred and ten pages, and proves considerable activity and vigour on the part of the Society. The abstract of proceedings shows that much is done at the meetings, not only by many interesting exhibits, but by short papers and comments, to make the work of members available for general instruction. Amongst these, Mr. Lucas's demonstration of dragonflies, and especially of their early stages, and Mr. Clark's lantern slides of microscopic preparations, may be referred to as instances of valuable original material. It may further be mentioned that the illustrations on p. 95 are process reproductions of enlarged photographs by the latter member.

Two papers are reported in full; one on "The Scientific Aspects of Entomology," by Mr. Tutt, and one entitled "Lazy Days by the Sea," by Mr. Adkin. Under the latter unpretentious title, Mr. Adkin gives some interesting notes on insect life at Eastbourne, especially particulars of the habits of *Bryophila perla* and *B. muralis* as affecting walls in Eastbourne and its vicinity. Mr. Tutt's paper is supplemented by his presidential address. The latter, amongst other matters, deals in a thoughtful way with some present aspects of questions of natural selection. The most interesting perhaps is a discussion founded on a passage in Bateson's work, in which that author says that "the differences between species are specific, and are differences of kind, forming a discontinuous series; whilst the diversities of environment to which they are subject are, on the whole, differences of degree, and form a continuous series." After noticing the entire begging of the question involved in the first half of this passage, Mr. Tutt addresses himself to pointing out that environment varies in precisely the same way. He devotes some space, with copious instances, to show that what we unthinkingly, at first view, regard as identical environments of two different organisms, because forsooth they occupy the same place, are, for these two organisms, owing to a difference of habit, as different environments as if they occupied opposite sides of the planet. A change of food-plant would be a discontinuous change, though all else remained identical; a different season of emergence and many other such differences make the same place and climate a very different environment to its different inhabitants. We have not space to follow up this demonstration, and must refer our readers to the address itself, whilst congratulating the Society on the energy and vitality it displays in this volume.

The Coleoptera of Suffolk. By CLAUDE MORLEY, F.E.S. Pp. i–xiv, 1–113. Plymouth: James H. Keys. 1899.

COLEOPTERISTS, especially those residing in Suffolk, will be grateful to Mr. Morley for producing this county list. It appears to have been prepared with care, and the compiler has not only given exact localities, but in very many cases has added useful notes concerning habits, &c., of the species. One thousand seven hundred and sixty-three species are referred to; this is rather more than half the number known to occur in Britain. In the introductory pages there are short notices of some Suffolk coleopterists, and remarks on the geology and physical features of the county. There is also a map of Suffolk, on which the "districts" mentioned in the list are indicated.





W. J. Lucas del.

MECOSTETHUS GROSSUS, Linn.

(NAT. SIZE.)

THE ENTOMOLOGIST

Vol. XXXII.] JULY, 1899. [No. 434.

MECOSTETHUS GROSSUS, Linn.

= *flavipes*, Gmel., Don., Steph.
= *germanicus*, Stoll.
= *rubripes*, De Geer.

By W. J. Lucas, B.A., F.E.S.

(Plate II.)

In 1889 Mr. Eland Shaw wrote:—"*M. grossus* is distributed widely over Northern Europe and in Spain in marshy localities, and will, I expect, be found fairly plentiful in our fen districts when properly looked for."* Recent captures shew that this prophecy seems likely to be fulfilled, and, in order to enable any collector who should visit boggy collecting-grounds during the coming August to identify the insect, our editor has kindly placed at my disposal part of this month's magazine for figures of the species, and a few notes upon it.

At the date mentioned above, Mr. Shaw knew of but two modern captures of this species: one specimen taken by Mr. R. McLachlan in the fens of Norfolk, and one by Mr. H. N. Ridley in Co. Kerry; the latter recorded in the Ent. Mo. Mag. vol. xx. p. 215, as *Pachytylus cinerascens*. Previous to this date, however, the late Mr. J. C. Dale took the species at Whittlesea Mere, Parley Heath, and in the New Forest; while Mr. C. W. Dale recorded it as occurring on the Dorset heaths and in the Isle of Purbeck, the last specimens he took in the latter locality being captured on July 27th, 1880. He says further that it "has occurred in the West of Ireland, and in the counties of Dorsetshire, Hampshire, Huntingdonshire, Cambridgeshire, and Norfolk; and in former years in the marshes close to London."†

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* Ent. Mo. Mag., 1889, p. 413.

† Entom., 1895, p. 333.

On September 10th, 1892, one male was taken at Irstead in Norfolk amongst tall rank grass close to the bank of the River Bure, this being the first recorded capture of the species in Britain since the taking of the Kerry specimen, which was recorded by Mr. Ridley in January, 1884. In July, 1895, it occurred in abundance in the West of Ireland, as recorded in the 'Irish Naturalist,' vol. iv. pp. 228 and 258, by Mr. M. G. H. Carpenter; while in September of the same year Mr. B. G. Rye took the species in Norfolk in some numbers by sweeping the bog-myrtle (*Myrica gale*). The next year Mr. Wm. Jeffreys took several in a bog, a few miles from Lyndhurst, in the New Forest; and he has also found it in another spot on the same side of the Forest (*in litt.* 1897). Finally, in the beginning of August, 1898, Mr. J. J. F. X. King and myself found the species fairly common in two bogs on the other side of the Forest. In that season, which was a rather late one, it commenced to appear in the imaginal form just about the beginning of August: as the days went on it seemed to increase in numbers, but immature specimens were still taken. Possibly in early years it may be in the winged condition at the end of July.

Perhaps the fact that *M. grossus* loves the wettest and therefore often the least accessible parts of the bogs, may have caused it almost to escape notice for so long. As mentioned above, it has been taken amongst bog-myrtle and rank grass, but these conditions do not seem so much a necessity as a very wet state of the soil. It readily takes to the wing when disturbed, and then usually makes short but rapid flights of about ten or a dozen yards; but it will not move unless the sun is shining. On the ground its colours harmonise so well with the grass and rushes that it is extremely well protected, and, unless it took to the wing, it would be seldom seen. When flying, however, it is so conspicuous an insect that it is bound to be noticed.

M. grossus is a bulky insect, varying greatly in size. Length varies from 22 to 32 mm., and expanse of wings from 42 to 55 mm , the females being usually in both respects larger than the males. Top of the head triangular, the blunt apex being forward. Antennæ filiform ; longer in proportion in the male than in the female. Pronotum somewhat narrowed in front; lateral ridges nearly straight; median ridge prominent; transverse furrow anterior to the middle: hind margin bluntly rounded. Elytra more or less tinted with brown, especially at the apex ; a yellow streak along the basal two-thirds of the costal region ; in other parts nervures brown. Wings brownish at the tip ; more or less hyaline elsewhere ; anterior nervures brown ; hinder ones mostly colourless. Fore and mid legs brownish. Femur of hind legs carmine beneath, with an internal black streak ; swollen junction of femur and tibia black ; tibia yellow, generally with two black rings ; spines black. Valves of the ovipositor elongate. The general appearance of the living insect is yellowish-green and brown with crimson hind femora: immature specimens are often almost entirely rosy red.

Unfortunately there has been considerable confusion in the nomenclature of this species. Several specimens are in the British Museum Collection, in the Hope Museum at Oxford, and in the Dublin Natural History Museum, in each place labelled *flavipes*. This is due no doubt to Donovan, who gives a good figure of the species (Don. Nat. Hist. Brit. Ins. xii. p. 87, tab. 391), but applies to it Gmelin's name *flavipes*. Mr. H. N. Ridley's Kerry specimen was recorded as *Pachytylus cinerascens*, Fab., which error probably arose through his finding, either in Fisher's 'Orthoptera Europæa' or in Brunner's 'Prodromus der europäischen Orthopteren,' *Locusta flavipes* given as synonymous with *Pachytylus cinerascens*—a mistake of both authors, the second probably being due to the former (vide Eland Shaw, Entom. Mo. Mag. 1889, p. 412; 1893, p. 20).

12, Caversham Road, Kingston-on-Thames:
June, 1899.

TWO NEW SPECIES OF *CHARAXES*.

By the Hon. Walter Rothschild, Ph.D.

1. Charaxes northcotti, sp. nov.

♂. Allied to *C. kheili*, Staud. Fore wing on the upper side with a series of heavy marginal pale blue patches; a post-discal series of spots, of which the upper four are small and more or less white, the others larger and pale blue; a discal series of five spots down to lower median vein, the upper two white shaded at edges with blue, the posterior three pale blue, the second and third the smallest, the third closer to the cell than the others; two dots at apex of cell, separated from one another by the disco-cellular vein. On the hind wing there is a large discal pale blue patch from upper radial vein to near anal angle, about 6 mm. wide anteriorly, extending basad to near base of upper median branch, with a small spot in front, its outer edge somewhat concave between veins; white submarginal spots small, linear, much shaded with blue; admarginal spots large, pale blue. All the blue markings metallic. The under side does not present any obvious differences from that of *C. kheili*.

The series of discal spots on the fore wing and the large patch on the hind wing distinguish this species from all the allied ones.

Hab. Gambaga, northern territories of the Gold Coast, one male captured August 28th, 1898, by Major Northcott, to whom I have the pleasure of dedicating this fine species.

2. Charaxes madensis, sp. nov.

♀. Allied to *C. mars*, the female of which is figured by Oberthür in Bull. Soc. Ent. France, p. 194, f. 12 (1897); but differs in the white band of the blackish brown fore wing being wider and standing farther from cell; the inner edge of this band is deeply concave at the lower median vein; there is no separate post-discal series of spots on the upper side of the fore wing. On the hind wing, above, the white band is more sharply defined, much narrower, and all white; the blackish brown outer area is very much broader, the posterior patches at least four times the width of those of female *mars*, not separated from one another. On the under side the white scaling on the fore wing is anteriorly more extended than in the female of *mars*; the median black bars are more distal, the discal ones much feebler; the black submarginal spots of the hind wing are large and stand about 4 mm. from the edge of the wing. Length of fore wing 60 mm.

Hab. Mt. Mada, Buru, 3000 ft., August, 1898 (Dumas).

EMYDIA CRIBRUM: A REMINISCENCE.

By G. B. Corbin.

From my earliest collecting days *Emydia cribrum* has been a favourite species with me, but for several years past a limited power of locomotion has entirely prevented my visiting its particular haunts. When we consider the somewhat frequent, extensive, and all-consuming fires that periodically sweep over one or more of its favourite habitats, and this coupled with the greed of some collectors, it seems almost a marvel that the species has so far "held its own" in the comparatively limited area in which it occurs.

My first acquaintance with the species was in my schooling days—in 1860 or 1861, I believe—when I accompanied the Rev. Joseph Greene to the then famed "Parley Heath," where the insect was first discovered by Mr. Dale, and I recollect we took two or three specimens. Since then, I think I may safely say I have visited all the heaths for miles around, and some seasons have seen *E. cribrum* literally swarming in certain spots, and on particular evenings, for, although most collectors take it in the daytime, yet its natural time of flight is at dusk, or rather twilight, both morning and evening, and in the peculiarity of its abundance on particular occasions it displays a very marked characteristic of other Lithosiidæ; for who that has collected in the New Forest does not remember how *Gnophria rubricollis* sometimes swarmed on the tree-tops in the warm sunshine; or of an evening, in the riding of the same wood, *Lithosia griseola* var. *stramineola* was equally common; and formerly, but, alas! not now, how *Gnophria quadra* answered to the call of the beating-stick as it was applied to the branches of the trees?

I have many times found the ova of *E. cribrum*, and on several occasions have "put them down" in likely looking spots in the Forest, especially in the northern parts around Godshill, &c., in the hope that my old friend the late Rev. H. G W. Aubrey may have had the privilege and pleasure of establishing a colony of the insect near his residence; but I have known of no instance where the insect has been taken west of the Avon, and my endeavours to introduce it to the locality seem to have utterly failed. This statement, however, requires qualification, for in the current 'Entomologist' (*ante*, p. 150) my friend Mr. J. H. Fowler records finding a full-grown larva at some particular spot *in the Forest;* and I can confirm his statement, as I saw the larva, and, having compared it with preserved specimens which both of us possess in our cabinets, I think there can be no doubt about its identity. It is to me a most interesting "find," as I have collected so many times in different parts of the Forest, but never came across a specimen of the insect there in any stage.

In the interesting article from the pen of Mr. Bankes (Entom. xxxii. 101–103) there is certainly a mistake in supposing that *E. cribrum* has not been bred from British larvæ. Mr. Fowler's two articles (Entom. 1892, p. 269, and 1894, p. 307) are sufficiently explicit, and must have been overlooked.* As to the "life-history" of this particular species, surely it has been fully described in some of the older entomological journals. I have sent away some hundreds of the ova to different friends and correspondents, and amongst others I may name the late Rev. J. Hellins, of Exeter, and Mr. W. Buckler, of Emsworth—an artist of no mean merit—who I am almost sure reared the insect more than once; and if the larva is figured in his work on larvæ—which, I believe, is now being published by the Ray Society—it would be interesting to know if it was from some of the ova or larvæ I sent him. I reared the insect myself in 1864. At that time the entomological portion of a little unpretending publication named 'Young England' was conducted by the late Mr. Howard Vaughan, who asked me to send him a note on *E. cribrum*, and in response I sent him a short article, in which I briefly described what I then knew of the species; and I make the following extracts from it:—

"The eggs are deposited round the stems of the common heather in the neatest possible manner, and when first laid they are of a bright golden colour, and in this respect may be mistaken for a yellow species of lichen which often grows around the stems of that plant; the eggs do not retain their yellow hue very long, but change to a purplish grey before they are hatched, which occurs in about a month or six weeks; and when the larvæ just emerge they are very small, black, and hairy; they then feed, but do not increase in size so rapidly as some other larvæ, and require to be safely secured or they will make their escape. . . . When more than half-grown they hybernate for the winter amongst their food, feeding again and completing their metamorphosis in the following spring. . . . The larvæ which I found in the spring were black, studded with tubercles, bearing short tufts of black bristly hairs, and a dirty white stripe down the back. Other specimens have been reared in which the colour of the body has been blackish red, and a dingy pink, and one of which had the pale stripe down the back of a slight greenish tint. . . . The larvæ, when full-grown, change to pupæ in an upright position in the midst of a tuft of their food (*Aira cæspitosa*). . . . The moth emerges in June and July, but Mr. Dale writes me, 'I have taken the female of *cribrum* as late as August.' . . . . As regards the insects themselves, they usually fly in the evening, but may sometimes be 'put up' in the day. When settled they are scarcely visible at a little distance, from their slender form when at rest, as the wings are wrapped more closely around the body than any other Lithosiid with which I am acquainted; also, when taken in the net, they fall to the bottom, feigning death. They never fly very high—usually about two or three feet from the ground—and their flight is generally very easy, rising and falling in undulations very similar to the Phryganidæ. This peculiarity of the insect while on the wing renders it well known to those who have had the pleasure of taking it. . . . When struck at with the net, and missed, they either fly off at increased speed, or else fall down amongst the tangled heather-stems, being then most difficult to find, as they contract their legs, fold their wings closely, wrap their antennæ beneath them, and slide about in such a manner that to capture them is almost an impossibility; but should success attend the efforts made in such a case, the insect is found scarcely worth the trouble of setting, from the mutilation its wings have sustained."

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* *Vide* p. 185.—Ed.

It has been supposed that *E. cribrum* is double-brooded, but all my experience points in the opposite direction. I have taken it as early as May 23rd, and an occasional female as late as the first week in August; but its time of appearance in any given year depends upon whether the season is forward or backward. I believe there is a development of a succession of broods, and that members of the same family are developed all about the same time. Sometimes of an evening you find the insect commonly over a particular area, and the next time you visit the spot it is scarcely to be seen, but you get it at some distance equally abundant; whereas in a week hence the first locality is the most productive. The mere fact of the eggs being laid in June, and remaining in the same state for a month or more, would be a factor against a second brood, even in an exceptionally warm season, and a moth taken at the end of July may, I think, be safely called a late specimen of the only brood produced in one season.

It must be remembered that these observations were made many years ago, but in principle they agree very closely with Mr. Fowler's more recent remarks, from the fact that both are taken directly from nature.

On one occasion I recollect having a female of the species emerge, and thought I would try "sembling," and with this idea put her in a willow chip-box, which I placed in my coat-pocket, and, having arrived upon the heaths, forgot all about the box and its contents until the unusual abundance of the moths brought to my recollection the imprisoned lady love; no less than three males were in my pocket, and several others were underneath my coat in various directions. I placed the box on a low furze-bush, and netted thirty males in a less number of minutes; and I may say, without the least exaggeration, I could have taken several hundreds if I had wished to do so. The next evening I tried the same experiment on the same ground, but the attractive charm had then vanished; but I am quite sure that very few people, even entomologists, could have believed in the extreme abundance of the insect on such an occasion as the previous evening unless they had seen it. My experience points to one strange peculiarity about the species, *viz.* that although the ova are usually, if not invariably, laid on the heather, the larvæ will seldom take to it as a food *in confinement;* but, as Mr. Fowler remarks, his were reared upon common groundsel, and those who have found the larvæ know very well that they are sometimes to be taken where the heather is very sparse, although most of the works where the larva is described give heather as the food-plant.

In penning these remarks it brings to one's mind and memory how many honoured names have passed away within a comparatively few years, and leaves a regret that some of the kindness and geniality of their lives seems to have died with them, as far as entomology is concerned. An interesting and somewhat conspicuous figure in my recollection of *E. cribrum* is poor old Charles Turner, "the beetle man," whom I often met in my rambles of an evening, generally returning from his toilsome day's work upon the heaths, usually with a leafy branch of some sort in his hand to drive the tormenting flies from his sunburnt face, whilst he held a conversation with "the missus," who trudged along the dusty road some paces behind her spouse. Doubtless some of the present readers of the 'Entomologist' may recollect a few pleasant days or hours spent in pursuit of

E. cribrum, but few will have realized more pleasure, or had greater facilities for its capture, than I have had in the past.

Ringwood: June 7th, 1899.

PHYSIOLOGICAL EXPERIMENTS UPON *DYTICUS MARGINALIS*, Linn.

By Henri Gadeau de Kerville.*

Dyticus marginalis lends itself very well to physiological experiments, as it is very hardy and endures captivity excellently. For nourishment, small pieces of meat of some kind are sufficient. Its gluttony is such that not only does it devour those of its kind who have expired, but even attacks—at least in captivity—those in whom a little life yet remains. I have observed that it gnaws the posterior extremity of the elytra first of all, then the integument of the postero-inferior part of the abdomen, to eat the contents.

I have remarked, as has also our learned colleague Dr. Maurice Régimbart,† that a male of *D. marginalis* can fecundate two or three females in a relatively fairly short time; in one of my experiments a male fecundated three females in less than three weeks.

Desirous of ascertaining whether the males, possessed by an imperious sexual desire, would copulate with a dead female of their species—a fact observed in other insects—I left dead females with very vigorous males (a couple in each bowl) for some weeks without observing, on the part of the last, any amorous propensity; these males manifested upon them their voracity, however, to a slight degree. I killed the females a short time before the experiments by means of alcohol or chloroform, and left them for half an hour beneath a stream of running water to rid them of any odour from the destroying liquid. I also kept males only for some time in small basins, to see if they would attempt copulation; I have not observed even an attempt at pæderasty.

It is, however, the action produced upon *Dyticus* by cold, heat, deprivation of atmospheric air, by chloride of sodium and of magnesium, that I have particularly studied. A number of more or less analogous experiments have already been made by eminent physiologists, among them Paul Bert, Léon Frédéricq,

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* 1897, Bull. Soc. Ent. France, pp. 91–7 (translated by G. W. Kirkaldy). These experiments were made upon fifty male and female individuals of *Dyticus marginalis*, L., which were obtained for me by my friend Mr. Paul Noel, the zealous director of the "Laboratoire régional d'Entomologie agricole" of Rouen.

† Ann. Soc. Ent. France, 1877, p. 268.

Félix Plateau, Paul Reguard, Charles Richet, Henry de Varigny, Emile Yung, &c. I ought to add that all my experiments have been conducted with healthy males and females of *Dyticus marginalis*, and I have registered the temperature of the water with a Centigrade thermometer.

Dyticus marginalis possesses great vital endurance, and, in making experiments upon it, it is very important not to allow oneself to be deceived by its apparent death. In fact, I have had occasion to observe several times in the course of my experiments that individuals which appeared dead, and for several days manifested their existence only under the influence of mechanical stimuli, were able nevertheless to return to life.

Action of cold.—Everyone knows that the ponds and ditches of northern countries which *Dyticus marginalis* inhabits are covered, during the cold season, with a mantle of ice more or less thick, which remains sometimes for weeks without melting, though without at all occasioning the death of the Dytici. Do these insects, despite the lowering of the temperature, retain their normal activity, and consequently respire as actively; or, on the other hand, does the cold lessen their activity to a greater or less degree, as in the majority of insects, which then consume much less oxygen?

The fact that the Dytici which live in water of which the temperature is only 3° or 4° are quite as lively as if it was at its habitual temperature of the warm season—a fact which I have observed several times—leads one to think that at the temperature of melting ice the activity of these insects remains identically, or almost identically, the same. I wished to have the experimental proof of this. I therefore placed the Dytici in a large glass bowl, which I filled entirely with pieces of ice, and placed in a situation where the temperature was low, so that the ice melted slowly. Four days after there was still a small fragment of ice in the bowl, which proves that the temperature of the water had remained very near freezing-point. During these four days my insects showed themselves quite as active as at the mean temperature of the water in which they live. I obtained the same result by placing other examples of *D. marginalis* in a bowl filled with water which I surrounded completely with bits of ice, and left outside for two days during the cold. The congelation of almost the whole surface proved to me that the water in which my insects were swimming was at a temperature sensibly equal to 0°.

To sum up, the temperature of melting ice does not render *Dyticus* at all torpid, and consequently, when the surface of the water where they live is not completely frozen, these Coleoptera consume the usual quantity of oxygen.

Action of want of atmospheric air.—What happens when the surface of the pond is frozen over its whole extent, so that the

Dytici cannot come there to seek a fresh provision of atmospheric air? Must we admit that they have the faculty of living and of moving during very long periods, while consuming only the provision of air that they have stored up? A number of terrestrial insects, it is true, resist asphyxia for some time when they are kept submerged under water. They consume the air stored up in their tracheæ, and, as they are then more or less torpid, their respiration is less active, and, correspondingly, their provision of air is exhausted more slowly. But, to be exact, this resistance lasts for a few days at the most, and there are many ponds and ditches containing Dytici where the surface remains entirely frozen over for weeks. I was anxious to experiment upon the resistance of *D. marginalis* against asphyxia. I therefore disposed, at different times, some male and female Dytici in such a manner that they could swim freely, but, by means of a wire-grating, were always submerged. My experiments show that in general—there are, of course, very numerous, but more or less insignificant individual variations—the Dytici which cannot come to the surface to renew their store of air are, at the end of one to three days, more or less torpid, move slowly, sometimes even appear dead, and, after a duration of two to five days (according to the endurance of individuals), they have very generally ceased to live. Eight days are, I believe, the maximum of the duration of resistance of *D. marginalis* against asphyxia.

I observed that if the elytra and wings of *Dyticus* are removed, or if only the posterior half of the elytra and wings are cut away, the insect ascending freely to the surface of the water, it usually dies at the end of one to three days, for in this condition the air penetrates only very insufficiently, or even not at all, into the tracheæ. On the other hand, the duration of resistance against the want of oxygen is prolonged when one removes from each individual the elytron and wing on one side only. In fact, the insect, on returning to the surface, stores up a provision of air under the remaining wing and elytron; but this is done only with difficulty, and the respiration operates more or less badly, and always so inefficiently that death ensues at the end of a few days.

One can, I believe, deduce from these experiments that in the ponds and ditches in which the surface is completely frozen the Dytici habitually preserve their normal activity, and that they find the atmospheric air indispensable to their respiration—under the mantle of ice, under the leaves, amid the branches of plants, under stones at the margins of streams, &c. One may suppose also that many individuals lessen their activity in consequence of an insufficient quantity of oxygen for their respiration; but I am convinced that if they were completely deprived of atmospheric air, all the Dytici in a pond or ditch would, at the end of eight days, entirely cease to live.

Action of heat.—In the study of this action upon *Dyticus marginalis*, the experiments must be separated into two groups: those in which the temperature has been increased or lowered gradually, and those in which the Dytici have been plunged suddenly from cold water into hot water, or *vice versâ.*

From repeated experiments I have assured myself that by gently increasing the temperature of the water in which the Dytici are found one can bring it to temperatures of 30°–35° without the insects appearing greatly inconvenienced. To afford a basis of calculation, I will take the duration of about an hour to make water of 5° pass to a temperature of 30° to 35°. Up to 30° the Dytici always retain their usual activity. It is from 30°–35° that they begin to suffer more or less strongly from the temperature of the water: some swim more rapidly than ordinarily; others try to leave the medium in which they are placed; others become more or less motionless. Be that as it may, I have kept Dytici in water whose temperature was maintained at 35° for more than two hours; and I do not doubt that, without serious inconvenience to my insects, it would have been possible for me to prolong the experiment for hours more, perhaps even for days, with individuals of strong resisting powers. From 35°–40° the Dytici perish at the end of an obviously variable time. At 40° they succumb usually at the end of about four to ten minutes. At 50° their death ensues between one and three minutes, and above 50° they always die very rapidly. If, after having gradually increased the temperature of the water up to a maximum of 40°, one then lowers it little by little to near its original temperature, the Dytici endure the experiment perfectly.

If, instead of working by a progressive elevation and lowering of the temperature, one suddenly plunges into water registering 30°–35° C. some Dytici which were in water at about 5°, these insects, as I have observed, always swim more or less rapidly for several seconds, after which they become motionless at the end of one or two minutes at the most, then appear dead; but little by little they return to life, and regain all their activity at these temperatures, which are very high for these insects.

If the Dytici be plunged suddenly into water at 40°, 50°, or upwards, the same phenomena are produced; but it is very evident that the rapidity of immobility and death is in direct proportion to the elevation of the temperature. According to my experiments, the Dytici that one passes without transition, from water at about 5° to water at 40° or 50°, are quite dead after remaining ten minutes in water at 40°, and five minutes in water at 50°.

If, instead of passing the Dytici at once from cold water to hot, one suddenly plunges into cold water, say, at 5°, Dytici accustomed to water possessing a temperature of 30° to 35°, in which they were very active, one observes precisely the same effects as in the sudden passage from cold to hot water. These insects usually swim for a few seconds, after which they become motionless and appear dead; then little by little they stir all their legs, and finally recover their normal activity in this water at 5°.

To be precise, my experiments upon the action of heat on *Dyticus marginalis* show that temperatures of water very near 40° are those in which this coleopteron can live only for a more or less short time, and also that the immobility of the Dytici, previously very active, is manifested in the same manner in the sudden passage from cold to hot water, or *vice versâ*.

Action of chloride of sodium. — The endurance of *Dyticus marginalis* in saline water is very great. In fact, I have kept in 1000 grammes of water containing 50 grammes of sodic chloride —that is to say, 5 per cent.—some Dytici which died only seventeen days after, others having succumbed after a shorter lapse of time. Now, 5 per cent. is twice the quantity of marine salt contained in the water of the temperate parts, at least, of the Atlantic Ocean. Moreover, the Dytici were dead only at the end of nine days in water containing 10 per cent. of sodic chloride. It should be added that during the first third of the duration of these experiments my Dytici appeared very little incommoded by the surrounding medium.

I observed that in water containing 5 per cent. of chloride of sodium, Crested and Palmated Tritons, both species adult and very vigorous, were dead at the end of four hours, and that, in water containing 10 per cent. of it, they succumbed in less than an hour, the Crested Tritons dying much less rapidly than the Palmated Tritons, which are smaller.

Action of chloride of magnesium.—I wished also to note the injurious action upon *Dyticus* of this salt, which in a general manner comes immediately after sodic chloride, in point of view of quantity, in the composition of the water of the seas of our planet.

The experiments which I have made to this end permit me to say that the resistance of *Dyticus marginalis* to the action of magnesic chloride is sensibly the same as its resistance to sodic chloride.

In water containing 5 per cent. of magnesic chloride, some individuals perished only at the end of nineteen days, and in water containing 10 per cent. of it the Dytici died only after living nine days. I ought to add that other individuals succumbed there in a much shorter time.

Some very vigorous adult Palmated Tritons were quite dead at the end of an hour in water containing 5 per cent. of magnesic chloride, and, what goes without saying, more rapidly still in water containing 10 per cent.

In my opinion the great endurance of *Dyticus marginalis* in water containing very large quantities of chloride of sodium or of magnesium, in which it is placed without any transition—an endurance due without doubt largely to its protective integuments—permits of the supposition that one would be able, working gradually, to keep it living continually in brackish water when it is adult. Perhaps one would even arrive, in habituating them progressively during a series of generations, at the point of making it accomplish therein the entire cycle of its existence? This opinion finds great support in the fact that a closely allied species, *D. circumflexus*, F., normally inhabits both fresh and brackish water.

Finally, I much wish that entomologists would make similar experiments upon *Dyticus marginalis*, to see if their results agree entirely with mine, and upon other aquatic insects with trachæan respiration, for such experiments, made with precision, are useful for the knowledge of the biology of the insects.

BERGSTRASSER ON THE CLOUDED YELLOWS.*

The "goats-clover butterfly," or "orange-yellow hay butterfly," *Papilio hyale*, L., is a light concolorous Danaid. The name "goats-clover butterfly" (geisstaudenfalter) is made use of by the Viennese entomologists, because the Austrian goats-clover (geisklee) or trefoil forms the food-plant of the caterpillar. This caterpillar may be classified amongst the side-striped larvæ (seitenstreif-raupen), of which the above mentioned "Christ's thorn butterfly" (kreuzdornfalter), *Papilio rhamni*, L., is an example. On account of its colour it is compared to the orange, and is called in France the "hay butterfly," because it makes its first appearance in the hay season towards the end of summer.

Our illustration (Plate II. figs. 3 and 4) shows the upper and under side of the female. As this butterfly would often be confused with the next following, *P. palæno*, L., Herr Esper gives an accurate description of it. The ground colour is orange-yellow in the upper wings. These are also, in the middle towards the anterior edge, marked with a black spot. On the outer edge it has a broad blackish brown border, with detached bright yellow spots. The fringe is always rose-coloured. In the smaller reddish yellow ground of the lower wings a beautiful orange-yellow spot stands well out. The border is also dark here, as in the upper wings, and likewise distinguished by bright yellow spots; but it is not quite so broad, and does not extend so far towards the end. On the inner edge the wings are bright yellow, and along the margin greenish. The body is coloured greenish grey, but on the flat under-portion bright yellow. The neck, head, and antennæ are beautiful rosy red. In the male the bright yellow spots in the border are wanting, and the fore wings are more rounded. Then in the female the tip runs out into a somewhat lengthened projection.

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* Translated from Bergstrasser's 'Nomenclatur,' 1779, by Mrs. Brown, Rosefield, Elgin.

This insect lives in warm countries, such as the Fatherland. It is not found in Sweden and Denmark, but appears in Africa and America. It is caught towards the end of summer, and often even far into harvest, in our fields and meadows on the late flowers, by which it is nourished, and also in the open and higher situated regions, although it does not reach these so frequently as the following one.

The history of this butterfly yet requires many additions before its egg, caterpillar, and chrysalis, with all the facts pertaining to them, are fully described.

The "crown-vetch butterfly," or "sulphur-yellow hay butterfly," *Papilio palæno*, L., is likewise a light concolorous Danaid. The systematical mistakes which have hitherto been made regarding this butterfly have already been clearly brought out by Herr Esper. It is called the "crown-vetch butterfly" (kronwickenfalter), because its caterpillar is fed on the variegated crown-vetch, the *Coronilla varia* of Linné, as the Viennese entomologists specify. It also seeks its nourishment from the *Pteris aquilina*, as Linné ascertained; so the butterfly might still have been named from the eagle-herb (common bracken) without the crown-vetch. It is called "hay butterfly," because it is found in this country in great numbers in June and July. In September it still flies in woods, over heaths, and meadows.

It may be distinguished from the former butterfly by placing the two in apposition, as the coloration of both is different. Of the caterpillar there is no drawing at present. The leading entomologists reckon it amongst the side-striped larvæ.

In the female the colours are paler, and the male is somewhat smaller. It is thus difficult to distinguish them from each other, especially as the ground colour and the bordering of the wings are sometimes lighter or darker without distinction of sex.

NOMENCLATURE OF LEPIDOPTERA.

In a bulky volume, entitled 'Proceedings of the Fourth International Congress of Zoology,' recently published, there are among the papers one or two relating to Entomology, and two appendices. One of these latter deals with the subject of nomenclature of Lepidoptera, and presents the opinions of several eminent lepidopterists upon some very difficult matters chiefly in connection with the law of priority.

Sir George Hampson, who originated the correspondence, propounded the following set of questions: —

1. Whether the tenth or twelfth edition of Linnæus shall be taken as the basis of zoological nomenclature?
2. Is it necessary to add any other pre-Linnæan authors' names to the list of those whose works were accepted by the Committee of the British Association?
3. Are the genera of Hübner's *Tentamen* to be accepted or not? If accepted, what date is to be assigned to them?
4. Are the genera of Hübner's *Zuträge* to be accepted or not?
5. Are the genera of Hübner's *Verzeichniss* to be accepted or not? If accepted, what date is to be assigned to them?
6. Whether the terminations *iidæ*, *iinæ*, or *iadæ*, *ianæ* are to be employed?
7. By what process is the type of a heterotypical genus to be ascertained?
    - *a.* What is the type of *Phalæna*, L.?
    - *b.* What is the type of *Tortrix*, L.?
    - *c.* What is the type of *Tinea*, L.?
    - *d.* What is the type of *Alucita*, L.?

    Show how the result is arrived at in each instance, and discuss the value of the names *Phalæna*, L., and *Tortrix*, L., giving the reasons for your conclusions, and stating on what published or unpublished rules you rely.

There are three other questions; but, as these arise out of those referred to above, there is no occasion to repeat them here.

There is no doubt that these enquiries are of considerable importance, and there is equally no doubt that they, together with the replies thereto, will have a world-wide circulation through the medium in which they appear. It has occurred to us, however, that the area of publicity might be extended by reprinting in this Journal the opinions of some of the entomologists consulted, particularly so far as concerns questions 1, 3, 4, and 5.

1. Replies in favour of the Tenth Edition of Linnæus (*date 1758*).

Lord Walsingham writes: —

"The tenth edition, 1758, should be adopted. The British Association Committee, in § 1, established the law of priority; and in § 2 they wrote:—

> 'The binomial nomenclature having originated with Linnæus, the law of priority in respect of that nomenclature is not to extend to the writings of antecedent authors.'

"Strickland's rules were drawn up in 1842, and adopted by the British Association at Birmingham, 1865 (*vide* Sclater, pp. iii and 23). In the original draft no edition of Linnæus was selected (Strickland having left a blank space for the insertion of the edition to be adopted); the twelfth edition was inserted by the Manchester Committee in 1842 (*vide* Sclater, p. 24). 'This was not done as being the first in which the binomial nomenclature had been used, as it commenced with the tenth; but as being the last and most complete of Linnæus's works, and containing many species the tenth did not.'

"The Committee having admitted that the binomial nomenclature originated with Linnæus in the tenth edition, 1758, and having laid down the principle of priority from *the inception of the binomial nomenclature*, illogically stultify § 1 and § 2 by adopting the twelfth edition, 1766–68. In this they cannot be followed; their action was inconsistent with the principles they advocated."

Mr. W. F. Kirby writes:—

"I hold that the tenth edition of Linnæus should be accepted, for the following reasons:—

(*a*) The binomial nomenclature was fully established in it.
(*b*) The binomial nomenclature was accepted and employed by many eminent writers between 1758 and 1767.
(*c*) The twelfth edition was not a new work, and made no new departure. It is only a revised and large edition of the tenth.
(*d*) Linnæus's own species, described in the twelfth edition, cannot be properly elucidated without reference to works of his own, and of other writers, published between 1758 and 1767.
(*e*) The number of alterations in nomenclature necessitated by going back to 1758 will not be so great as to produce serious inconvenience."

Prof. Fernald (U.S. America) writes:—

"I am positively in favour of regarding the tenth edition of Linnæus as the basis of zoological nomenclature, for the reason that in this edition of the 'Systema Naturæ' the author has not only given us a distinct idea of the binomial system of nomenclature, but has also consistently used it; so that, if the latter editions of his work had never appeared, there is no question in my mind but that the system would have been adopted by later writers, just as was done by Scopoli and Artedi. All agree that Linnæus conceived this binomial idea, and that later writers perceiving its decided advantages adopted it. If it is claimed that it was not presented clearly enough in the tenth edition, and for this reason the twelfth edition should be taken as the starting-point, but that the works of Scopoli and Artedi using this system clearly should be recognised, why then do not those who argue in favour of the twelfth edition propose to have it start from 1763, the date of Scopoli's 'Entomologia Carniolica'?"

Prof. Smith (U.S. America) writes:—

"Logically the tenth edition of the 'Systema Naturæ' should be taken as the starting-point. In this work the binomial system is consistently applied to all classes of organisms, and may be said to have its real beginning.

"The question is not a new one in the United States, and the almost universal tendency is to make the tenth edition the starting-point. Canon xiii. of the 'Code of Nomenclature' of the American Ornithologists' Union covers this point, and there the reasons for its adoption are given at length. They seem convincing to me, and this code is generally adopted by our entomologists. I have adhered to this in my 'Catalogue of the Noctuidæ of Temperate North America,' and in all my monographic papers."

Four other gentlemen, *viz.* Aurevillius (C.), Grote (A. R.), Snellin (P. C. T.), and Staudinger (O.), intimated that they preferred to adopt the tenth edition, and, with certain reservations, Dr. Scudder concurred in Lord Walsingham's remarks; Sir George F. Hampson and Mr. Meyrick at first inclined to the twelfth edition, but finally they agreed to accept the tenth. It would seem then that all the entomologists to whom this question was submitted have pronounced in favour of the tenth edition of the 'Systema Naturæ' as a starting-point.

(To be continued.)

NOTES AND OBSERVATIONS.

Emydia cribrum in the New Forest.—The larva which I mentioned in last month's issue of the 'Entomologist' was that of *E. cribrum* all right; I have already taken over fifty of the perfect insects, and there are still many left upon the wing in the New Forest. The series caught are very much whiter than those I get from Verwood; some are almost white, and none approach the dark forms obtained in the other district. I think this interesting, as it seems to me to be indigenous to the locality, and not an introduction. I should like to know whether anyone has ever taken this species in the New Forest proper before.—J. H. Fowler; Ringwood, June, 1899.

Emydia cribrum.—Mr. J. H. Fowler's remarks on this species (*ante*, p. 150) have greatly interested me, and he is quite right in supposing that when writing my notes (*ante*, pp. 101–3) I overlooked his observations recorded in Entom. xxvii. 307–8, which I much regret having done. I am extremely pleased to hear that he has discovered a locality for the species actually *in* the New Forest. This interesting fact does not of course affect my previous statement, based on information given me by the Rev. O. P. Cambridge and corroborated by Mr. George Gulliver (both of whom knew Mr. Bond intimately, and used frequently to accompany him in his expeditions in search of *E. cribrum*), that the late Mr. Frederick Bond, on whose authority the published locality for the insect was given as the "New Forest," used this rather misleading term to denote the locality near Ringwood where he always worked for it, no one in his time knowing of its existence in the New Forest proper. To this day the resident collectors in the New Forest take all their specimens of *E. cribrum* near Ringwood, and to the best of my belief no one but Mr. Fowler has ever met with it within the limits of the Forest itself. — Eustace R. Bankes; The Rectory, Corfe Castle, June 19th, 1899.

Locust Extermination. — The following account of the successful use of Locust Disease Fungus is published in 'The Agricultural Journal' (xiv. p. 460), which is issued by the Department of Agriculture, Cape of Good Hope. Writing from Trapper Valley on March 18th, 1899, Mr. J. H. Benn says:—

"Since returning to this district I have infected nearly 250 separate swarms of locusts. On most farms there are numbers of distinct swarms, that is, batches which have sprung up from various egg-centres, and until the flying stage is reached they do not seem to amalgamate into very large swarms, nor do they travel very far, as there is plenty of food for them in this stage. The locusts on which I am working are about two to three months old, but in many places they are still hatching, so that all ages are to be met with. Probably the majority of locusts now in voetganger stage started hatching in January, and will pass into the flying stage in about two months' time. Unfortunately the weather has been so dry that on a number of farms I have required to infest the locusts more than once, but whenever there has been any moisture either in the evening or early morning the results have been most satisfactory. The method that I have adopted is to put the fungus, which has grown on the sugar and water, into a shallow dish, place this in the middle of a swarm of voetgangers, and with the aid of one or two boys drive the locusts in the direction of the dish. Very soon hundreds have passed through the infected material, and those that have been unable to get out I carefully remove and place on some green stuff, mealie tops, etc., at the same time sprinkling some of the solution over the green food. If the weather is favourable, the locusts start dying on the fourth, fifth, or sixth day, but the length of time that elapses before the fungus begins to take effect depends entirely on the amount of moisture in the atmosphere. In some swarms that I have been able to watch personally the fungus has not started to kill till the eighth day, and in one remarkable case at Bathurst I put a boy on to watch where the locusts went. They travelled about 300 yards from the place that I infected, but did not start dying until the tenth day, and on the fourteenth day the flowers of the mealies, amongst which the locusts were, became simply black with the dead voetgangers. They always seem to make for the highest point when they are dying; in this case they were in such numbers that many of the flower-stalks were broken by their weight."

We understand that supplies of the Locust Disease Fungus may be obtained from the Director of the Bacteriological Institute, Graham's Town, at a cost of sixpence per tube by all residents in the colony who may require it. Outside the colony applicants will be required to pay extra postage.

Resting Position of Hesperia tages.—Sixteen years ago I figured and described in the 'Entomologist' the moth (Noctua)-like resemblance assumed by this butterfly while at rest. A further note on the subject may be worth recording as an example of the power of mimicry and discrimination which this species undoubtedly possesses to a very acute degree for the purpose of protective resemblance. On May 30th last, between 5·45 and 6 p.m., my wife and I found fourteen specimens of

H. tages which had just settled down for the night upon dead flower-heads of knapweed on part of a bank for a distance of about 150 yards; nine were found within exactly ninety yards, and on one dead plant there were three individuals; but the particular point of interest is that all fourteen specimens were settled in exactly the same position, *i.e.* with their backs to the sun, which was shining brightly, heads uppermost, and wings folded down, wrapping over the dead, chequered, brown, weather-worn flower-heads, which form a very remarkable similarity to the butterflies; a fact which I do not think it is too much to say the insects appear to be fully aware of, as we frequently touched and attempted to dislodge them, which merely had the effect of making them settle down all the closer. We were unable to find any at rest on any other plant, although we carefully searched the mixed vegetation growing on the bank.—F. W. Frohawk; June, 1899.

CAPTURES AND FIELD REPORTS.

Collecting at Bettws-y-Coed, North Wales.—During a few days' stay here at the beginning of this month (June), I found Lepidoptera very plentiful. Among Noctuæ, at sugar, the commonest were *Grammesia trigrammica, Acronycta rumicis, Thyatira batis, Gonoptera libatrix, Phlogophora meticulosa*, and *Triphæna pronuba.* I also took *Euplexia lucipara, Xylophasia rurea, Noctua plecta, Agrotis exclamationis, Aplecta prasina, Hadena thalassina, Cucullia umbratica, Odontopera bidentata, Abraxas ulmata, Melanthia albicillata, Larentia viridaria, Melanippe montanata.* A lady gave me a perfect specimen of *Amphidasys betularia* var. *doubledayaria*, which she found lying dead on a mountain path. I also saw *Macroglossa stellatarum* at rhododendron blossom. *Pieris brassicæ* was out in numbers.—F. D. Bland; June 19th, 1899.

Extraordinary Abundance of Macroglossa stellatarum.—From June 4th, up to the time of writing, *Macroglossa stellatarum* has been observed here in the utmost profusion, attracted principally to the blossoms of lilac and wallflower; as many as six have been noticed hovering over a lilac tree at one time, and, judging from the reports which reach me from all parts of the town, there must be many hundreds of the insect on the wing. *M. stellatarum* is an insect which is seen occasionally, most seasons, in this locality: but why it should have been almost entrely absent in 1898, and one of our commonest moths in 1899, is a problem which it would be very instructive to have explained. — James C. Haggart; 58, St. Andrew Street, Galashiels, June 11th, 1899.

Variety of Euchelia jacobææ.—On the 19th inst. my son, Arthur Basset Hearle, captured in an old garden at Brockhurst Cottage, near Gosport, a female specimen of *E. jacobææ* in which the crimson colour was replaced by bright yellow. This I believe to be most unusual. The insect is a little smaller than the ordinary type.—Parkins Hearle, Lieut.-Colonel; 12, Foster Road, Alverstoke, June 21st.

Deilephila livornica in the Isle of Man.—A specimen of *D. livornica* was taken by me on Douglas Head on May 23rd last, as it was hovering over the flowers of *Selene maritima.* It is in splendid condition and measures three inches from tip to tip. Another example was taken by Mr. William Garrett, of Douglas, on the 12th, in the same locality. The weather has been bad here, and I have not been able to collect as I had wished to have done.—Thomas Crennel; 6, St. George's Terrace, Douglas, Isle of Man.

Vanessa cardui in 1899.—On May 28th I saw a specimen of *V. cardui* at the Black Pond, Esher, and I think that I have seen another since, but the second example was on the wing. — W. J. Lucas; Kingston-on-Thames. *V. cardui* was common in the Broads district near Lowestoft early in June, but the specimens taken were in poor condition.—J. Prest; Broad Street, Teddington.

SOCIETIES.

Entomological Society of London.—*June 7th*, 1899.—Mr. G. H. Verrall, President, in the chair. Mr. Edgar Greenwood, of Frith Knowl, Elstree, Herts, was elected a Fellow of the Society. Mr. J. J. Walker exhibited, on behalf of Mr. G. F. Mathew, R.N., a number of interesting Lepidoptera, chiefly from the Mediterranean region, and including amongst others the following:—Examples of *Thais polyxena*, Schiff., var. *ochracea*, Staud., having an unusually deep and rich colour, bred from larvæ found at Platæa, Greece; male and female of *Thestor ballus*, Hb., from Alexandria, taken on 23rd Jan., 1898, the male remarkable in being largely marked with orange on the upper side of the front wings; unusually large specimens of *Lycæna baton*, Berg., from Vigo, N. Spain; and a singular aberration, from Corfu, of *Melitæa didyma*, Ochs., with central band of black spots very strongly marked on both wings, the other spots being obsolete and the ground colour pale fulvous. Colonel Yerbury exhibited the pupa-case of a Hymenopterous insect which appeared to be parasitic in the weevil—*Barynotus mœrens*, Fab. Dr. Chapman showed a large Ant-Lion-larva from Cannes, probably that of *Acanthaclisis occitania*; it was one of those that do not make pitfalls. Mr. E. E. Green exhibited a teratomorphic specimen of a zygænid moth, *Chalcosia venosa*, Walk., which he had found at rest on a leaf, at Udagama, Ceylon, in October 1898. In this specimen four wings were present on the left side, the hindmost being almost as fully developed as the normal hind wing on the right side, while the other three appeared to be attached to the meso-thorax. He also showed larvæ and pupæ of insects in air-tight glass tubes in which a little cotton wool, sprinkled with formalin, had been placed. The specimens, which had been thus preserved for nearly two years, had lost little of their original colour or brilliancy. Mr. Gahan exhibited pupa-cases of a Longicorn beetle, *Plocederus obesus*, Gah., which were remarkable in being composed almost wholly of carbonate of lime. It was not known how the pupa-cases were fabricated, but presumably the larvæ must possess special lime-secreting glands. Mr. R. Mc Lachlan, F.R.S., read a paper on "A second Asiatic species of *Corydalis*," and exhibited the male type of the species described, which he proposed to name *Corydalis orientalis*. He said the first Asiatic species of *Corydalis* was described and figured by Prof. Wood-Mason in 1884. the genus up to that time having been considered to be peculiarly American. Mr. H. J. Elwes, F.R.S., communicated a paper "On the Lepidoptera of the Altai Mountains"; and the Rev. A. E. Eaton a paper entitled "An Annotated List of the *Ephemeridæ* of New Zealand."—J. J. Walker and C. J. Gahan, *Hon. Secs.*

South London Entomological and Natural History Society.—*April 27th*, 1899.—Mr. A. Harrison, F.L.S., President, in the chair. Mr. Smith, of Tresco Road, Peckham, was elected a member. Mr. Drury, F.R.H.S., presented to the Society's collections a large number of the species of the smaller Lepidoptera. Mr. Ashdown exhibited several specimens of the earwig, *Forficula auricularia*, showing considerable variation in the shape and size of the forceps. Mr. Burr said that the example with unusally small forceps was a very rare aberration. Mr. Harrison, photographs of *Morpho epistrophis* taken at short intervals after emergence until the wings were fully expanded. Mr. Edwards, a male and four forms of the female of the polymorphic *Papilio memnon*, a very fine specimen of *P. segonax*, with the closely allied species *P. ulysses.* Dr. Chapman, several species of Psychids and their cases, *Lycæna orion*, *Setina aurata*, with strong black markings, *Gnophos variegata*, *Acidalia marginepunctaria*, &c., taken the first week in April at Locarno, N. Italy. Mr. Enoch, a specimen of the locust, *Acridium tartaricum* (*ægypticum*), taken March 10th, 1898, at Wembley Park. Mr. Malcolm Burr read a paper entitled, "Orthoptera, with special reference to British species." In a chatty manner he discussed the bibliography of the group, and remarked on the present backward state of our knowledge of it. He referred to the present workers and the work they were doing. The various sections and genera in the group were distinguished at some length and where possible examples were given from the English fauna. After giving many interesting personal observations made in various parts of Europe, he pointed out particularly the directions in which members could aid in the fuller investigation of this neglected order.

May 11th.—The President in the chair. Mr. J. A. Harrison, of Forest Gate, was elected a member. Mr. Turner exhibited a small printing apparatus, which he had received from Mr. King, of Glasgow, and which was admirably sufficient to print all ordinary locality labels. Mr. Edwards, a number of pupæ of *Hepialus lupulinus* from Blackheath. Mr. West, specimens of the aquatic Hemipteron, *Plæa minutissima*, from Blackheath. Mr. Tutt exhibited a number of lantern slides to illustrate the subject of "Mimicry" which he discussed from various points of view. Among the subjects illustrated and discussed were the European *Mantis religiosa*, *Euchloë cardamines*, *Amphidasys betularia*, *Kallima inachis*, *Limnas chrysippus*, and its mimic *Hypolimnas bolina*, a *Heliconius* and its *Pierid* mimic, *Papilio merope* and its polymorphic females which mimic forms of *Danais*, &c.

May 25th.—The President in the chair. Mr. Ashdown exhibited specimens of the two sexes of the Coleopteron, *Osphya bipunctata*, taken in May in Huntingdonshire, together with the two forms of the male. Mr. West, a specimen of the rare Hemipteron, *Drymus pilicornis*, obtained from moss at Box Hill. Mr. Edwards exhibited a considerable number of species of *Cicadidæ*, chiefly from Borneo and India, and read notes on the group.

June 8th.—Mr. J. W. Tutt, F.E.S., Vice-President, in the chair. Mr. Adkin exhibited a series of *Boarmia cinctaria* from the New Forest, showing an unusual range of variation for that district. Mr. Main, a number of large and brilliant species of Coleoptera from the West Coast of Africa, including the remarkable *Rhina amphicollis*, which has the beak much produced beyond the insertion of the antennæ and covered with bristles. Mr. Sich, living specimens of *Ephestia elutella*, bred from maltings in Hammersmith. Also ova of *Hepialus lupulinus*, and gave details as to the changes of colour after deposition. They were exhibited under the microscope. Mr. Dennis, ova of *Gonepteryx rhamni* under the microscope. Mr. Edwards, a specimen of the hive-bee pest *Galleria mellonella*, and remarked on the damage so caused to beekeepers. Mr. Clark, ova of the freshwater fish parasite, *Argulus foliaceus*, and gave details as to its occurrence, the deposition of the ova, their changes in colour, and the manner of copulation. Mr. Adkin read a report of the field meeting held at Chatham on May 27th, under the guidance of Mr. Walker, R.N., F.E.S., and he also gave an account of the annual congress of the South-East Union of Scientific Societies, on the council of which he had been elected.—Hy. J. Turner, *Hon. Rep. Sec.*

North London Natural History Society.—The annual Whitsuntide excursion to the New Forest took place as usual, the dates this year being May 19th to 22nd. On the whole, the outing was extremely enjoyable, and, although the season was decidedly backward, collecting was by no means bad; it would have been materially improved, however, had the weather been more sunny. As it was, butterflies were very scarce. The following are the principal captures. Larvæ:—*Zephyrus quercus*, *Pœcilocampa populi*, *Eriogaster lanestris* (very young), *Bombyx neustria*, *Nola cucullatella*, *Catocala promissa*, *Amphidasys strataria*, *Metrocampa margaritaria*, *Cleora glabraria*, *C. lichenaria*, *Pseudoterpna pruinata*, &c. Imagines:—Several *Eugonia polychloros* were seen, and also one *Callophrys rubi*. Amongst the captures were *Nisoniades tages*, *Syrichthus malvæ*, *Nemoria viridata* (one), *Tephrosia punctularia*, *Bapta bimaculata*, *Cyclophora* (*Zonosoma*) *punctaria*, *Odontopera bidentata*, *Panagra petraria*, *Macaria liturata*, *Spilosoma mendica*, *Cilix glaucata*, and *Phytometra viridaria*. A few *Brenthis euphrosyne* were also taken, and *Gonepteryx rhamni* was in evidence as usual.—Louis B. Prout, *Hon. Sec.*

Carlisle Entomological Society.—*May 4th*, 1899.—Mr. James Murray in the chair. Mr. Wilkinson exhibited the following Micro-Lepidoptera from the Carlisle district:—*Nepticula salicis*, *N. æneofasciata*, *N. argentipedella*, *Coleophora limosipenella*, *Argyresthia ephippella*, *Ornix guttea*, *Gracillaria straminella*; and *Phlœodes crenana* from Threlkeld, near Keswick. Mr. Day, a number of Coleoptera, including a specimen of the rare beetle *Lebia crux-minor*, taken near Carlisle; also *Bradycellus placidus*, *B. similis*, *Agabus chalconotus*, *A. sturmii*, *Acilius sulcatus*, and *Staphylinus erythropterus*. Mr. James Murray, *Stomis pumicatus* and *Megacronus cingulatus*, from the district.

June 1st.—Mr. James Murray in the chair. Mr. G. B. Routledge showed *Bembidium monticola* and *Hydroporus davisii*, from Gelt River. Mr. J. Murray, species of *Bembidia*, including *B. atro-cæruleum*, *B. decorum*, *B. monticola*, *B. punctulatum*, *Tachypus flavipes*, *Stenus guttula*, *Tachyusa flavitarsis*, *Helophorus granularis*—all from the river Irthing. Mr. F. H. Day, *Bradycellus cognatus*, *Pterostichus vitreus*, *P. æthiops*, *Cymindis vaporariorum*, *Helophorus arvernicus*, *Calathus micropterus*, from Castle Carrock Fell; *Bembidium stomoides*, *B. paludosum*, from Gelt; *Phytodecta olivacea* var. *nigricans*, which is a rare variety. Mr. Wilkinson, *Tephrosia crepuscularia* (*biundularia*), *Hypsipetes ruberata*, *Lobophora carpinata*, *Bupalus piniaria*, from Carlisle. Members reported Lepidoptera to have been scarce this spring.—G. B. Routledge.

Birmingham Entomological Society.—*May 15th*, 1899.—Mr. G. T. Bethune-Baker, President, in the chair. Mr. A. H. Martineau showed a few insects taken at St. David's, S. Wales, on April 22nd, this year. He found there a very large colony of *Anthophora pilipes*, accompanied with great numbers of *Melecta armata*. They were in a most inaccessible spot, burrowing in a bank of drift, and although they were in thousands he was only able to secure two or three males of each. He also showed *Ammophila hirsuta* and *Nomada succincta* from the same district. Mr. J. T. Fountain showed a boxful of Lepidoptera, all taken this year, including male specimens of *Saturnia pavonia*, taken at Sutton on April 30th, by sembling; *Selenia illunaria*, from Acocks Green; a lot of Tæniocampæ, including *Pachnobia rubricosa*, from Marston Green; *Anticlea badiata*, from Knowle and Marston Green; and *Anisopteryx æscularia*, from Moor Green. Mr. G. T. Bethune-Baker, two drawers full of Palæarctic Melanargias and Erebias.—Colbran J. Wainwright, *Hon. Sec.*

RECENT LITERATURE.

The Butterfly Book: a Popular Guide to a Knowledge of the Butterflies of North America. By W. J. Holland, Ph.D., D.D., LL.D., &c. Size 10 × 7 inches. Pp. i–xx, 1–382. Plates, coloured, 48. New York: Doubleday & McClure Co. 1899.

This book is, so far as we know, the first attempt that has been made to bring together in a convenient form, and present in a more or less popular style, the information that is possessed in reference to the various species of butterflies occurring in North America, The author has acquired all the types of W. H. Edwards and Theodore L. Mead, and has had the use of the types of species recently described by Dr. Henry Skinner. His collection, which is claimed to be the most complete of the diurnal Lepidoptera of North America extant, has been utilised as the basis of the hundreds of figures which are given on the forty-eight excellent coloured plates. These figures are photographed directly from the specimens themselves, the colouring being reproduced with remarkable accuracy. With the exception of a few obscure or unimportant species, all the butterflies recorded on the American continent from the Gulf of Mexico to the Arctic Circle are delineated by the new photographic process. One hundred and fifty species are here figured in colour for the first time. This fact alone adds considerable scientific importance to the book, especially as all these figures are taken from the type-specimens. The neuration of each genus is also illustrated by at least one figure, and altogether there are one hundred and eighty five cuts in the text.

The introductory chapters deal with the life-history and anatomy of butterflies; capture, preparation, &c., of specimens; classification; previous works. All these subjects are treated in a clear and concise manner.

With this volume for a guide, the merest tyro should experience no difficulty in identifying his captures in North American Rhopalocera, and there is no doubt that the book will be the means of largely increasing the number of "butterfly-hunters" in the United States and Canada. The student of European Lepidoptera will also find the book of value. As already stated, the plates are excellent, and we may add that the letterpress printing and general get-up are in every way worthy of them.

We are pleased to learn that the author contemplates the publication of a companion volume on the Moths.

Note.—With regard to colour-photography and its application to the illustration of books on Entomology, we may mention that the art seems to be pretty well understood in this country. We recently received from a firm in London some samples of this kind of work, and among them was a plate of exotic butterflies. The specimens, which had evidently been selected to give a wide range of colour, were all most faithfully reproduced, and we understand that this result was attained with three printings only.

The Larvæ Collector's Guide and Calendar, giving the Times of the Appearance of the Macro-Lepidoptera in all their stages.

In this handy little volume of ninety pages, which is published by Messrs. Davis of Dartford, we have useful information concerning the field-work of the lepidopterist. There are also notes on rearing Lepidoptera, on the general management of larvæ, and on preserving larvæ.

Macro-Lepidoptera of North Staffordshire and Cannock Chase. Compiled by the Rev. T. W. Daltry, M.A., F.L.S., &c.; and revised (1898) by John R. B. Masefield, M.A. 8vo, pp. 29. Stafford: J. & C. Mort. 1898.

This list, which is reprinted from the 'Transactions' of the North Staffordshire Field Club, is on the same model as that published in 1875, when 378 species were enumerated. The total now reaches 503, including Pyralidæ and Crambidæ.

Report of the Entomological Department of the New Jersey Agricultural College Experiment Station. By John B. Smith, Sc.D. Pp. 373–467. Illustrated. Trenton, N.J.: The John L. Murphy Publishing Co. 1898.

Cornell University Agricultural Experiment Station, Entom. Div., Bull. 157. *The Grape-Vine Tea-Beetle.* By M. V. Hingerland. Pp. 213. Illustrated. Ithaca, N.Y. 1898.

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NOTES ON AQUATIC RHYNCHOTA.—No. 3.

By G. W. Kirkaldy.

1. *Corixa melanogaster*, n. sp.

Belongs to subgenus *Basileocorixa*, Kirkaldy; allied to *C. selecta*, Fieber.

Pronotum, clavus, and corium feebly rastrate. Pronotum with obtuse lateral angles, membrane not distinctly separated from corium. Intermediate tibiæ one-fourth longer than tarsi, which are one-seventh longer than the claws; metaxyphus long, isosceles triangular, subacute.

♂. Frontal fovea suboval, rather shallow, extending to about one-third of the length of the eyes (as seen below), two small foveæ posterior to the base. Anterior tibiæ somewhat dilated apically, palæ long, narrow, cultrate (length four times as great as width at base), with about thirty-six small rounded blunt teeth extending from base to apex. Strigil rather large, almost square, about eight rows of teeth (the five basal, regular and parallel; the three apical, somewhat broken). Length 8 mill., breadth 3 mill.

Costa Rica, Alajueta (coll. Montandon).

Dark olive-brown. Pronotum with 11–12 rather irregular yellow lines; yellow lines dilated and entire at base of clavus, undulated and interrupted at apex; undulated and subentire at base of corium; abbreviated and contortuplicated on membrane and apex of corium. Corium not divided by regular longitudinal dark lines. Metanotum bluish black. Dorsum of abdomen black, segments 2 and 3 more or less reddish, connexivum and apex of last segment pale. Apical segment of posterior tarsi blackish. Venter entirely black, except the exterior lateral margins of pleura, legs, apex of metaxyphus, &c.

This species, of which I have only seen the male sex, is separable from all the other Americans of the "*selecta*" group known to me, by the form of the palæ.

2. *Corixa denseconscripta*, Breddin. Novo Friburgo (coll. Montandon).

3. *C. kollarii* (Fieber). Guadelupe (coll. Montandon).

4. *C. hyalinipennis* (Fabricius). *Sigara hyalinipennis*, Fabricius, cannot (if the male example from Java in Dr. Montandon's collection belong, as I believe, to this species) be referred to the genus *Cymatia*, Douglas and Scott, and is therefore only remotely allied to *C. bonsdorffii* (C. R. Sahlberg) and *C. coleoptrata* (Fabricius). It belongs to the genus *Corixa*, Geoffroy, and may for the present be referred to the subgenus *Agraptocorixa*, Kirkaldy, although I have not been able to find a strigil in the male. I have not erected a new subgenus for it, as I have seen only one example, which may not after all really be referable to the species of Fabricius.

To the characters of *Agraptocorixa* (1898, Ann. Mus. Genov. (2), xix. p. 144) should be added :—" Palæ subcultrate, armed with at least one row of denticles on the concave side. Strigil present." *C. hyalinipennis* has the frons (male) lightly impressed, not at all excavated.

5. *Anisops naïas*, n. sp.

♀. Vertical margin (vertex) two and a half times as wide as synthlipsis, lateral margins of notokephalon slightly-curvedly diverging. Scutellum one-fourth longer than pronotum. Pronotum obsoletely punctured, scutellum smooth, elytra punctured. Anterior tibiæ flattened, much dilated laterally, curved outwards, as long as tarsi and claws together; first tarsal segment one-half longer than second, which is twice as long as (each of) the stout digitiform claws. Tarsi somewhat incrassate, the second segment stouter at the apex than at the base. Intermediate tibiæ similar to the anterior, one-fourth longer than tarsi and claws together; first tarsal segment one-half longer than second, which is twice as long as the falciform claws. Length 7 mill., width 1·7 mill.

Chile, Viña del Mar (Perth Museum and my collection).

Luteo-stramineous. Abdomen blackish. Claws tipped with black.

Very different from any other American species. Allied, though much slenderer, to *A. wakefieldi*, F. B. W. White, from New Zealand.

The two individuals bore the manuscript label "*Notonecta hyalinipennis*."

Acanthia reuteriella, n. sp.

Belongs to typical subgenus, and would be included in section "ee" in Stål's catalogue of exotic species.

Superficially punctured. Rostrum reaching beyond intermediate coxæ to base of mesosternum. Third and fourth segments of antennæ pilose, with long sparse bristly hairs also; fourth segment a little swollen. Second segment twice as long as the first, one-half longer than the third; third and fourth equal. Posterior tibiæ nearly three times as long as tarsi, first tarsal segment one-fifth longer than second, which is twice as long as the large falciform claws. Length 4½ mill., width 1·9 mill.

Australia, Albany (Perth Museum, Scotland, and my collection).

Black, opaque; with golden pubescence, abundant on pronotum and scutellum, more sparingly on head and elytra. Eyes and ocelli yellowish. Two basal segments of antennæ obscure yellow (black underneath the first, except at apex), two apical black, with golden pile. Rostrum obscure brown. Elytra: a luteous spot close to the internal suture of the clavus; two elongate flavescent spots on the exterior margin, and three or four smaller spots on the disk, of the corium. Membrane transparent flavescent, except a black blotch at the base near the exterior margin, and another towards the apex; nervures brownish with obscure centres. Legs yellowish; coxæ, femora ventrally (except the basal half of the posterior pair), tibial and tarsal spines, anterior tibiæ narrowly at base and apex, black. A faint brownish smudge dorsally, in the middle, on the anterior tibiæ. Ventral surface black, apical margin of sterna and abdominal segments very narrowly (sixth segment very broadly) yellowish.

I dedicate this handsome little species to Dr. O. M. Reuter, who has made such a laborious study of the difficult palæarctic species. I believe that *Acanthia* will be found to inhabit the tropics much more commonly than has hitherto been supposed.

The ninth "Band" of Hahn and Herrich-Schäffer's 'Wanzenartigen Insecten' is dated 1853 on the title-page, and this date has been generally accepted by modern authors. The greater part, however, was apparently published at least one year earlier, and I have reason for supposing that each "Band" may have been published in several separate "Hefts." I call attention to the matter here, as possibly someone may still be in possession of the original covers.

On pp. 47–8, Schäffer, in dealing with the genus *Corixa*, says that he has only just seen Fieber's synopsis of the European species (Bulletin Soc. Imp. Naturalistes de Moscou, p. 505) published in *1848*, and, as his coloured plates were finished long before, he has not altered his manuscript.

Now, it is almost incredible that an entomologist, student of the Rhynchota from 1829 at least, and therefore presumably in communication with other rhynchotists, should—writing in 1853—be only just aware of an important work published in 1848, and apparently quite ignorant of Fieber's three still more important papers published in 1851 in the 'Abhandlung Böhm. Gesell. Wissensch.'

Dallas, in the second part of his 'List of Hemiptera in the British Museum,' dated *1852*, *quotes* the ninth Band of 'Die Wanzenartigen Insecten' as 1850 for some pages (*i.e.* 232, 237,

&c.), and 1851 for others (*i. e.* 246, 257, &c.); while in several instances he quotes two dates, *i. e.* (on p. 427) "Metapodius, *H. Sch. Wanz.* ix. 239 (1850), and 257 (1851); *Spin.* Tav. Sin. Hem. 42 (1850)," thus incidentally asserting that part at least of this ninth Band was published before Spinola's work.

According to Dallas, p. 240 was the last page published in 1850, p. 241 commencing 1851; and, as a matter of fact, the ninth Band is divided into "hefts" of forty-eight pages each, p. 240 thus completing the fifth "heft." Were these issued in separate, dated covers? In the only copy I have seen these, if at one time present, are not now preserved. The following details may also be noted:—

1. Schäffer dates his preface from Regensburg, Jan. 1852.
2. The preface (by J. E. Gray)—presumably written after the completion of Dallas's manuscript—is dated June 6th, 1852.
3. The usually accepted date of the eighth Band is 1848; Dallas, in part i. of the 'List,' quotes some early pages as 1845, later ones as 1846.

COLLECTING IN THE FENS, 1899.

By F. M. B. Carr.

Unfortunately, when my father and I arranged to pay a visit to Wicken some months ago, we forgot the enemy of entomologists, the moon. Curiously enough, however, nearly every evening was so cloudy that it made but little difference, and we really had darker and more favourable nights than the collectors of the week before, but the wind was generally north-east or south-east.

On Saturday, June 17th, a baking hot day, we arrived at Soham station about five p.m., having previously been half choked with dust, and nicely-cooked in a railway-carriage containing ten people. Mr. W. O. Bullman, of Wicken, with whom we stayed, met us at the station, and during the drive to Wicken informed us that *Hydrilla palustris* had failed to put in an appearance this year, whereat we were somewhat disappointed, as I at least had had foolish day-dreams with regard to this insect.

What with the drive, the country air, and a most excellent tea (Mrs. Bullman's teas always are excellent), we felt quite ready for the fray, and after seeing Mr. Solomon Bailey we proceeded with him to the fen about nine p.m.

The night was moonlight and rather cold, with an east wind; just about as unpromising as it could be! Of course under these circumstances nothing much could be expected.

Dusking produced single specimens of *Earias chlorana*, *Miana arcuosa*, and *Meliana flammea*. *Herminia cribralis*, *Hepialus* *humuli*, and *H. lupulinus* were abundant, together with an occasional specimen of *Coremia unidentaria* (*? ferrugata*).

Light was, of course, bad, but we took single specimens of *Spilosoma urticæ*, *Macrogaster arundinis*, male, and *Hadena pisi*. *Spilosoma menthastri*, *Meliana flammea*, and *Herminia cribralis* also turned up.

Treacle was, however, a great attraction, and the following were seen:—*Leucania pallens*, *L. comma*, *Meliana flammea*, *Noctua rubi*, *N. festiva*, *Grammesia trilinea*, *Apamea gemina*, *A. basilinea*, *A. unanimis*, *Hadena oleracea*, *H. pisi*, *H. dentina*, *Agrotis exclamationis*, *A. corticea*, and *Miana strigilis*.

The next day (June 18th) turned out beautifully fine and warm, and we felt very much excited at the idea of seeing *Papilio machaon* on the wing, never having done any fen collecting before. We were not in the fen many minutes before we saw a specimen of the beautiful "swallow-tail," which I succeeded in netting. We soon found that there were lots of them about, but, owing to their strong flight, a stiff breeze, and a baking sun, not to mention the rushes, we contented ourselves with a few good specimens, as there were plenty of ova and young larvæ with their white saddles about. A nearly full-grown larva of *Lasiocampa quercifolia* was taken on buckthorn. Larvæ of *Arctia caia* and *Liparis auriflua* were very plentiful. By the bye, I never want to see the latter again, as I have a most frightful time of it whenever I touch anything it has been in contact with, whereas it does not affect my father in the least. A specimen of *Vanessa atalanta*, and, at the entrance to the fen, several *Hesperia sylvanus*, were about the only other things noticed.

In the evening a larva of *Odonestis potatoria* was taken, and three specimens of *Bombyx rubi* were seen on the wing about eight p.m. The wind had shifted round to the west and was rather strong. The sky was cloudy, and a few drops of rain fell at first, but later on the drops became a steady shower. It was rather damp (rain generally is), but this was our best night at light, though that is not saying much. However, I suppose twelve *Macrogaster arundinis* (males) would be considered pretty good, at any rate Mr. Bailey seemed to think it was, but there was little else—*Meliana flammea*, *Cabera pusaria*, *Coremia unidentaria* (*? ferrugata*), and single specimens of *Hadena pisi* and *Ptilodontis palpina*. *Spilosoma menthastri* and *Nascia cilialis* were both abundant, and, however bad the night, the latter scarcely ever failed to put in an appearance, running up the sheet and looking so much more brilliant by the strong lamp light than on the setting-board. Treacle was more crowded than on the previous night, the additional species being a splendid specimen of *Chærocampa elpenor* and a *Phlogophora meticulosa*.

There were always plenty of things at treacle, and the following are additions to those already mentioned:—*Triphæna* *pronuba*, *Noctua plecta*, *N. c-nigrum* (two), *N. augur* (one), *Leucania obsoleta* (two; Bailey says this is a very rare insect in the fen), *L. pudorina* (abundant), *Hadena adusta* (one), *H. suasa* (a few), *H. thalassina* (one or two), *Aplecta advena* (two), *Agrotis segetum* (one or two), *Miana fasciuncula* (very abundant and varying from red to putty-coloured), *Xylophasia polyodon*, *X. lithoxylea*, *X. sublustris* (a few), *Rusina tenebrosa*, *Acronycta psi* (*? tridens*), *Gonoptera libatrix* (in fine condition some of them), *Herminia cribralis*, and *Nascia cilialis*.

Besides those already referred to as occurring at light, the following appeared:—One more *Spilosoma urticæ*, two more *Ptilodontis palpina*, *Earias chlorana* (occasionally), five more *Macrogaster arundinis* (males), *Epione apiciaria* (one), *Acidalia rubricata* (one), *Rumia cratægata*, *Cabera pusaria*, *Melanippe unifasciata*, *Lomaspilis marginata*, *Phibalapteryx lignata* (a few), *Eupithecia centaureata*, one *Collix sparsata*, *Miana strigilis*, *M. fasciuncula*, *M. arcuosa* (three), several more *Meliana flammea*, *Leucania pudorina*, *Rusina tenebrosa*, *Apamea gemina*, *A. basilinea*, *Noctua rubi*, *N. plecta*, *Agrotis exclamationis*, *A. corticea*, *Hadena oleracea*, *H. dentina*, *Xylophasia sublustris* (one), *Plusia festucæ* (a perfect specimen), and one *Hydrelia unca*.

Micros were more numerous, but, unfortunately, I can only give attention to the macros at present.

The following were taken on the wing in the evening:—A few *Earias chlorana* and *Phibalapteryx lignata*, and single specimens of *Spilosoma urticæ*, *Notodonta ziczac*, *Timandra amataria*, and *Collix sparsata*.

Day work had to take rather a back seat, as I found quite enough setting to do. However, we generally spent a few hours in the fen, and also had days at Chippenham and Tuddenham.

Larvæ were fairly plentiful:—A few full-grown larvæ and cocoons of *Odonestis potatoria*, two larvæ of *Lasiocampa quercifolia*; whilst searching buckthorn and sallow sticks for the latter I found eighteen larvæ of *Lithosia griseola*. A good many larvæ of *Bombyx neustria* were found, but *Arctia caia* and *Liparis auriflua* were the most abundant. Fourteen *Leucoma salicis* were taken from sallow, but they all occurred on bushes in a very limited area and seemed to be local. A batch of small larvæ of *Saturnia carpini* was found on low buckthorns, but I understand their favourite food in the fen is meadow-sweet. By searching dwarf sallows about a dozen *Clostera reclusa* were picked up, and a single egg of *Dicranura vinula* was found on sallow. Two full-grown larvæ of *Geometra papilionaria* were taken from birch, but they promptly paid me out for taking them by developing a fine lot of ichneumons.

My father beat three larvæ of *Scotosia dubitata* from buckthorn, all of which have emerged safely and are perfect specimens. *Tæniocampa gracilis* (abundant on meadow-sweet), *Papilio machaon* and *Gonepteryx rhamni* complete the Wicken larvæ.

Imagines were scarce, and the following were the only ones noticed during the daytime:—*Papilio machaon*, *Gonepteryx rhamni* (a battered male), the common Pierids, *Euchloë cardamines* (one male in the "drove"), one *Vanessa atalanta*, *Cœnonympha pamphilus*, *Epinephele ianira*, *Hesperia sylvinus*, *Bombyx rubi* (a few), *Fidonia atomaria* (some nice forms), *Lomaspilis marginata*, and *Camptogramma bilineata*. Six *Hyria auroraria* were walked up June 23rd.

On Wednesday, June 21st, Mr. Bullman drove us to Chippenham and back, where, by kind permission of Mr. Tharp, the owner, we had a day's collecting. I think Chippenham looks one of the best places round about, and Mr. W. J. Cross, of Ely, whom we met there, thinks "tons" of it. *Bankia argentula* was very much in evidence and we soon caught enough of them. By beating, seven specimens of *Erastria fuscula* came out, and other imagines seen were *Strenia clathrata*, *Fidonia atomaria*, *Euclidia glyphica*, *E. mi*, and *Phytometra ænea*. *Plusia orichalcea* larvæ had all disappeared; they had been well worked. Larvæ of *Tæniocampa gracilis* were abundant, as at Wicken, and about two dozen larvæ of *Cucullia verbasci* were taken from figwort; only about eight have pupated successfully. On the way home a big batch of *Vanessa urticæ* were seen.

Tuddenham is unfortunately most strictly preserved now for game, and all the collectors who paid this hunting-ground a visit had been turned off, Bailey included. We were, however, most anxious to take *Agrophila sulphuralis*, and accordingly went over June 24th. We succeeded, after most tiring work on a very dull day, in walking up ten *A. sulphuralis*, nine of which were good specimens, and six *Acidalia rubricata*, and just met the keepers when we had finished. About a dozen larvæ of *Scotosia certata* were beaten from barberry, but have not done at all well since, and there are now only about four survivors.

Altogether we were very well satisfied with our first visit to the fen, which was made all the more pleasant by the comfort of Mr. W. O. Bullman's rooms, and we were thoroughly well looked after. Mr. Solomon Bailey did all in his power to make the entomological part of our stay successful, providing us with lamps, sheet, treacle, and last, but by no means least, localities.

I may just mention that a magnificent female *Sphinx ligustri* was given to me by a man in Wicken, who had just taken it on a bush in his garden.

Of insects which we did not take, an occasional *Arctia fuliginosa* and *Viminia venosa* turned up at other sheets, and Mr. Bailey found two female *Macrogaster arundinis* at rest on rushes.

46, Handen Road, Lee, S.E.

A GUIDE TO THE STUDY OF BRITISH WATERBUGS (AQUATIC RHYNCHOTA).

By G. W. Kirkaldy.

(Continued from p. 154.)

Brullé, however, noted[*] that some individuals of a species of *Gerris* plunged rapidly beneath the surface upon attempted capture.

The foregoing and ensuing experiments and notices were made, as far as possible, on individuals in their natural habitat as well as in confinement, but it is of course exceedingly difficult to make minute observations upon such insects in the open.

The velvet-like pubescence, with which these insects are clothed, has been previously referred to as permitting the insect to respire without inconvenience by forming an air-bubble around it when beneath the surface, and also as preventing the entrance of water, either when submerged or by chance spray, into the trachæal system.

Meinert instances another scarcely less important use, *viz.*: that this air-investment enables the insects, after diving beneath the surface, to commence respiration of the upper air at once, allowing them to come up perfectly dry. In fact, this air bubble serves much the same purpose as the space between the elytra and the dorsal surface of the abdomen in *Dytiscus*, *Ilyocoris*, *Corixa*, &c., and the lateral grooves covered with two fringes of strong hairs on the venter in *Notonecta*. But it is necessary to the effectual working of the pubescence that it should be perfectly clean and free from dirt. I have previously remarked on the incessant care with which the Gerridæ cleanse themselves; and, taking into consideration the longer legs in *Gerris*, the process is very similar to that already described in *Hydroëssa*.

In nature, although *Gerris* is perhaps as common on small ditches and pools as on larger sheets of water, it by no means keeps to the shelter of the shore of the latter, making fairly long excursions out, and therefore does not thrive well, as a rule, in captivity.

When imprisoned in even a fair-sized bowl, they knock their heads and fore legs continually against the sides of the bowl, become enfeebled, subsequently water-logged, sinking at last to the bottom and there perishing.

Gerris is not at all of a timorous nature; with care, one can approach very close to them and observe them superficially without difficulty, and can even with a well-timed, rapid movement catch them with one's fingers. They are not, as a rule, disturbed when small pellets of earth are flung at them; and when they do skate away they always return before long to their old position.

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[*] 'Histoire naturelle, Insectes,' vol. ix.

The males of *Gerris* are most extraordinarily amorous, remaining coupled to the females for a long time. If one examines them during late spring or early summer, say June or the beginning of July, one finds the majority pairing, nearly all the solitary individuals being nymphs. The male rides upon the female (which is noticeably the larger), sitting somewhat back, the fore legs tightly gripping her around the mesopleura, the fore tarsi converging strongly, being placed along the first abdominal segment of the female, the middle and hind legs being quiescent or moving about aimlessly. The male grips the female so firmly in this position that one must employ some force to tear him away from her, and retains his hold even when the pair are lifted up from the water in the hand, the female meantime leaping, skating, or climbing gaily on, as if she had no such heavy encumbrance embarrassing her.

Meinert* selected a pair of *Gerris canalium*, Duf. (= *aptera*, Schumm., Meinert), and having placed them in a bowl gave them a couple of duckings. They forthwith sank to the bottom, and lay there some time motionless until he teased them, whereupon they mounted perpendicularly to the surface; but, although the male helped in the ascent by swimming with his middle and hind legs, upon this occasion, the female managed only to reach the surface with her head, and the pair sank again to the bottom. After ten minutes had elapsed the female was again teased, and the pair began again to move, swimming under water for some time. Shortly after the insects were taken from the water, and allowed to dry. They were then placed in the bowl again, but the female could not stand up on her legs, and the pair soon sank deeper and deeper in the water, so that only part of the female was above the surface. Hitherto the male had remained practically motionless (except for the few swimming movements previously narrated), firmly affixed to the female; but after he had floated about half an hour in this position, entirely submerged, he became disgusted with his situation, and began to loose his fore legs from their firm grip. Both now sank right down, whereupon the male tore himself loose, and left the female to lie on the bottom below, while he himself mounted up to the surface, and crawled up from the water on a twig, which was placed in it, by means of his fore legs. When he had gained a tolerably lofty place. he began to dry and preen himself as best he might. The female meantime remained lying as though dead, on the bottom of the bowl, for a quarter of an hour, and had by this time been almost an hour under water. She then, however, stirred slightly, and appeared to have some life yet remaining.*

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* I regret my knowledge of Danish is not so complete as I could wish, and I have had some little difficulty in interpreting several phrases, the learned author employing one or two words, at the meaning of which I have had to guess. I hope, however, that, checked by the few observations I have had the opportunity to make, the account here given will be found substantially correct.

The sexes are very easily separable in this genus. The females are nearly all a little more robust, but there are also well-marked external structural characters. In the females the apical margin of the last "abdominal" segment (that is to say, the last segment of the abdomen, with a "connexivum," or more or less flattened lateral piece, often apparently but, not actually, sutured off from the abdomen) is almost straight; while in the males it is usually more or less profoundly emarginate. This emargination varies more or less in form and extent in the different species. Seen from below there are three "genital" segments (that is to say, abdominal segments modified for sexual purposes, apical to the true "abdominal" segments, and not furnished with a connexivum) visible in the males, and only two in the females.

The apical segments of the venter are represented on plate iii.† fig. 15 ♂, fig. 16 ♀, &c.

(*a*) *Aquarius*, Schell., 1800 = *Hygrotrechus*, Stål, 1868.

There are two British species, generally known as *G. najas* (De Geer) and *G. paludum*, Fabr., the connexival spines in the former not projecting so far as, in the latter projecting as far as, or farther than, the apex of the abdomen. Now, as may be seen at once by anyone who will take the trouble to refer to the original description,† it is the *latter* that is *najas* of De Geer, *najas* of modern authors being distinctly referred to by the sagacious Swede as being a very similar but distinct species. His description (p. 312, &c.) refers to Pl. 16, fig. 7, which is undoubtedly *paludum*, auctt. He then describes (p. 314) the wingless form, referring to figs. 8 and 9 (certainly *najas*, auctt.), and concludes by saying (p. 319): "Je crois en attendant que les non-ailées, qu'on pourroit distinguer par le nom de *Punaise aquatique très-allongée non-ailée d'un brun noirâtre, à pattes antérieures courtes*, sont une espèce particulière." In the explanation of the plates the distinction is as strongly drawn (pp. 649–51): "La fig. 7, représente *la Punaise* (nayade) . . . ." [certainly *paludum* auctt.] "La fig. 8, est celle d'une Punaise aquatique, qui, quoique très semblable à la précedente paroît cependant d'une espèce différente et n'ayant point d'ailes, ni dans l'un ni dans l'autre sexe." "La fig. 9 fait voir en grand la même Punaise . . . ." Figs. 10 and 11, magnified portions of no. 8 [figs. 8–11 undoubtedly represent *najas* auctt.] Figs. 12–19 do not concern the point at issue. It is therefore evident that *paludum* auctt. is synonymous with *najas*, De Geer; while *najas* auctt. must take the name of *canalium*, Dufour,* the next name available. The synonymy will be:—

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* Further biological notices will be found further on, when treating of the earlier stages in the life-history of the Gerridæ.

† De Geer, 1773, 'Mémoires,' iii. pp. 311–22 and 649–51, Pl. 16, figs. 7–19.

1. Canalium, Duf. (type of subgenus).

Cimex lacustris, Sulzer, 1761 = "species allied to *C. najas*," De Geer (Mém. iii., pl. xvi., figs. 8 and 9), 1773 = *C. najas* var. *α apterus*, Retz., 1783 = *A. paludum*, Schell., 1800 = *G. aptera*, Schumm., 1832 = *G. canalium*, Duf., 1833 = *G. pausarius*, Curt., 1835 = *H. Najus*, Fieb., 1861 = *G. najas* of modern authors.

2. Najas (De Geer).

Cimex najas, De Geer, 1773, *l. c.*, pl. xvi. fig. 7 = *C. najas* var. *β alatus*, Retz., 1783 = *G. paludum*, Fabr., 1794, and modern authors.

In *G. canalium* the connexival spines do not project so far as the apex of the abdomen. The apical segments of the venter are represented on plate iii.† fig. 15 ♂, fig. 16 ♀; plate i. fig. 7 represents an antenna; plate i. fig. 11, the sterna.

This species is nearly always apterous, and I have seen it only in this condition. It is sometimes fairly abundant locally, though it can scarcely be considered common. It is well distributed over the southern English counties; but I know of only a single record (Lincolnshire) north of the Thames, and none from Scotland or Ireland.

In *G. najas* (De Geer), Kirk., the connexival spines project so far as, or a little farther than, the apex of the abdomen. It is rather larger than the preceding species, and is nearly always macropterous. I have seen brachypterous, but not apterous, individuals.

Figs. 17 and 18 represent the apical segments of the venter, male and female, respectively.

It is fairly well distributed, though common only locally, perhaps. Cardiff, Cowbridge and Ipswich are the only localities north of the Thames known to me.

(β) *Limnoporus*, Stål, 1868.

There is only a single species, *G. rufoscutellatus* (Latr.), which has been recorded from three or four localities only, widely apart, from Pitlochry to Hastings. It has a very wide distribution; the records of "*rufoscutellatus*" from Europe, Siberia, Turkestan, and North America all apparently referring to one species.

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* I have grave doubts as to the validity of the name "*najas*" at all, since De Geer, although mistakenly, refers it to the same species as *lacustris*, Linn.

† This plate will be issued with a future number of the 'Entomologist.'

I have seen only a single example, a male (kindly communicated from the Brussels Museum by the kindness of M. G. Severin), from which the apex of the abdomen (fig. 19) is figured; the corresponding parts of the other sex (fig. 20) are copied from Schummel. It is the *Cimex lacustris* of several early authors, but does not accord with the original description of Linnæus.

(To be continued.)

NOMENCLATURE OF LEPIDOPTERA.

(Concluded from p. 185.)

3. ARE THE GENERA OF HÜBNER'S 'TENTAMEN' TO BE ACCEPTED OR NOT? &c.

Sir George F. Hampson writes:—

"That the genera of Hübner's 'Tentamen' be excluded for the following reasons:—

"That it has no possible claims to be considered a scientific work, or more than a tentative list of names.

"That its genera are entirely undefined, and therefore excluded by the British Association rules.

"That there is no evidence it has ever been published, and that if published no even approximate date can be assigned to it. The first mention of the 'Tentamen' known to me is by Ochsenheimer in the preface to his volume iv. (writing in 1816). He gives its full title, and says that it was distributed by Hübner, and that he received it long after the publication of his third volume in 1810.

"We know from Geyer's account of Hübner in Thon's 'Entom. Archiv,' 1, 2, p. 28, 1827, that Hübner's method was to print off a few sheets of his various works and send them off to his correspondents whenever it suited him, and that his works were never regularly published till Geyer issued them after Hübner's death, so that his statement accords with what we know from other sources, and the passage was thus interpreted by Hagen who assigns to the 'Tentamen' the date 'before 1816, possibly before 1810,' quoting the passage in Ochsenheimer.

"In the preface to the 'Verzeichniss,' dated 1816, Hübner says that he attempted a system of classification ten years before, and immediately made it known. This may refer to the 'Tentamen,' but cannot be clearly shown to do so, and in opposition to the theory that the 'Tentamen' was distributed in 1806 we have the fact that it includes the Fabrician genus *Glaucopis*, published in 1807."

Lord Walsingham writes:—

"The genera of Hübner's 'Tentamen' are all recognisable, as the type is cited in each instance; they are more satisfactory than any genera in the Lepidoptera which had preceded them. They were adopted by Ochsenheimer in 1816 (*vide* 'Schm. Eur.' iv. p. viii), who regretted that he had not been able to employ any of the 'Tentamen' names in his third volume (1810), as at that time he had not seen a copy. Ochsenheimer moreover writes:—'Herr Hübner hat unter dem Titel Tentamen . . . den Entwurf eines Systems der Schmetterlinge auf einem Quartblatte abgedruckt herausgegeben,' &c. This can only mean that the 'Tentamen' was PUBLISHED on a quarto sheet of paper by Hübner.

"Now as to date. Sir G. Hampson, in his opinion, No. 3, seems to doubt that Hübner refers to the 'Tentamen' in the preface to the 'Verzeichniss.' Let Hübner speak for himself ('Verz. bek. Schm.' 3 (1816)):—'Die Grundlage dieses Entwurfes habe ich sogleich, unter dem Titel: *Tentamen determinationis digestionis atque denominationis singularium stirpium Lepidopterorum* bekannt gemacht, damit sie von Verstandigen, bevor ich sie annahme, geprüft und beurtheilt werden mochte.' Compare the words italicised with the title of the 'Tentamen':—'*Tentamen determinationis digestionis atque denominationissingularium stirpium Lepidopterorum*, peritis ad inspiciendum et dijudicandum communicatum, a Jacobo Hübner.'

"The words in italics are absolutely the same as those quoted in the preface to the 'Verzeichniss,' and it is impossible to imagine that they were used in reference to any other work than the 'Tentamen.' This being accepted as a fact, it is not difficult to arrive at the date of publication of the 'Tentamen.' In the preface to the 'Verzeichniss' (p. 3) it is expressly stated that Hübner drew up the 'Tentamen' 'vor zehn Jahren' for his own purposes, and immediately made it known. This preface was written in September, 1816, therefore 1816 – 10 = 1806 (the approximate date of the 'Tentamen').

"Zeller, writting to W. H. Edwards, June 23rd, 1876, said: 'The 'Tentamen' was printed not in 1806, but in 1805'; but no reasons were given for this emphatic assertion.

"To recapitulate, Ochsenheimer informs us that the 'Tentamen' was published before 1810; Hübner indicates the date of publication as 1806; while Zeller says that it was printed in 1805.

"The fact that *Glaucopis* for *pheyea* is common to the 'Tentamen' and to Fabricius, 1808, proves nothing. Fabricius and Hübner corresponded, and either author may have used the name in MS. before the publication of either work.

"So far I have only dealt with the question of publication and the acceptance of the 'Tentamen' by Ochsenheimer; there now remains the question whether the 'Tentamen' genera can be accepted as valid from the standpoint of a modern zoologist.

"The British Association Committee laid down two essential points as necessary before any zoological term could acquire the right to recognition in the following words (pp. 10, 11): 'Two things are necessary, before a zoological term can acquire any authority, viz. *definition* and *publication*.'

"It has, I think, been proved that the essentials of publication were complied with, for Sir G. Hampson's contention that Hübner's works were issued at irregular intervals, and were not *published* until they were *published* by Geyer, cannot be taken seriously. All works issued to subscribers have, after a time, a tendency to appear at irregular intervals. I suppose it will not be doubted that Herrich-Schäffer's work was properly published, but this appeared at all sorts of dates (*vide* H.-S. 'C B. Regensburg,' 1869), and the same remark equally applies to the 'Biologia Centrali-Americana' and all such works." [Sir G. Hampson remarks that each part of these works was issued at a definite date, but that Hübner, according to Geyer's account, kept his type set up, and printed off and issued a few copies whenever there was a demand for them.] "The authors of British Association Code laid down the following rule:—

"'§ 12. A name which has never been clearly defined in some published work should be changed for the earliest by which the object shall have been so defined'; and they previously remark: 'Definition properly implies a distinct exposition of essential characters; and in all cases we conceive this to be indispensable, although some authors maintain that a mere enumeration of the component species, or even of a single type, is sufficient to authenticate a genus.'

"No one will be disposed to doubt the necessity for full definition of all genera published *after* the acceptance of the British Association Rules, but it was impossible for authors who lived and died before these rules were made known to act up to them. All *previous* work must be tested by the meaning of the word 'definition.' Definition does not consist of a generic term accompanied by a greater or less number of mere words which are not diagnostic (*e.g.* the majority of Walker's genera in the British Museum Catalogues), but 'definition' means that the genus proposed shall be capable of comprehension. Hübner's works exemplify the two types of genera. In the 'Tentamen' we have genera which are readily understood, for the type is always cited: we turn to Hübner's figure and can understand what species was intended, and for ourselves test whether the genus be valid or not; on the other hand, in the 'Verzeichniss' the generic name is accompanied by what out of courtesy is called a diagnosis: these genera are for the most part composed of incongruous material, and it is impossible to ascertain what was the original type of the genus, but they are accompanied by some 'verbiage,' and if we follow the British Association ruling they must be accepted, whereas from a scientific point of view the 'Tentamen' genera, being monotypical and capable of absolute identification, are much more worthy of recognition. Citation of type is practically equivalent to definition, for anyone can understand what was intended by an author like Hübner, who figured all the species with which he was acquainted. I am therefore disposed to think that Hübner's 'Tentamen' genera comply with the requirements of 'definition,' and as they were 'published' we are bound to accept them.

"The requirements of § 2 of the German Zoological Society, 'Als wissenschaftlicher Name ist nur derjenige zulässig, welcher in Begleitung einer in Worten oder Abbildungen bestehend und nicht misszudeutenden Kennzeichnung durch den Druck veröffentlich würde,' are complied with, for Hübner's species are figured.

"If the citation of a type subsequently identified with certainty either from specimens or from a recognisable figure is not to secure the acceptance of a genus, the types of many of Felder and Rogenhofer's genera (and equally species) are rendered useless and take no precedence. The citation of types with generic definition is the exact equivalent of figuring a species and not describing it, and in the latter case this is accepted as 'defining' it."

Prof. J. B. Smith writes:—

"No, the genera of Hübner's 'Tentamen' should not be accepted. The evidence in Hübner's published works serves to indicate that this sheet was prepared somewhere about 1806, and was primarily a scheme for his own guidance—a tentative classification, such as almost every student has at times made in the groups which he was studying. Hübner printed his scheme, and apparently sent out a few copies to correspondents to obtain suggestions or criticisms, or for their information; much as if I should, by means of a hektograph or other mechanical device, multiply some scheme of my own, and should send it about as a suggestion. It might induce some co-worker who found the scheme feasible to adopt parts of it, just as Ochsenheimer did. It is in this light that I think that author's sentence 'daher konnte ich früher nichts davon aufnehmen' should be construed. There is no sufficient proof of 'publication.' Canon xxiv. of the A. O. U. Code, above referred to, reads:—'A *nomen nudum* is to be rejected as having no status in nomenclature.' It is remarked in comment or explanation that 'a name, generic or specific, which has been published without an accompanying diagnosis or reference to an identifiable published figure or plate, or, in case of a generic name, to a recognisably described species, is not entitled to recognition, being merely a name, and therefore having no status in nomenclature.'

"Under a very liberal interpretation of this, and assuming that the 'Tentamen' was really published, the names might stand, because the generic terms are associated with those of known species. But except to one familiar with the associated species no information is conveyed, since no author is cited for the specific name, and no reference is made to any publication where any species is recognisably described. As a whole, it is a bare outline of a scheme of classification, and nothing more: with not a clue to the characters upon which it was based, and not a syllable that would enable a student in Africa not thoroughly familiar with the European fauna to place a solitary specimen. It seems to me hardly possible to recognise 'Tentamen' names."

Prof. C. Aurivillius writes:—

"The names of *stirpes* in Hübner's 'Tentamen' are, as also all other generic names which are not accompanied by a generic description, to be regarded as not published (*nomina nuda*), and must be altogether rejected. I can by no means agree with those authors who regard a genus as established merely by naming a type. A genus is a systematical idea, and can therefore only be established by a description or by figures of the generic characters. If a genus could be established only by naming a type-species, no one would be able to form an idea of the genus without preserving that species. It is easy to understand how disadvantageous this should be for the systematists. Everyone has therefore a right to demand that an established genus shall be accompanied by a description by which he can form an idea of what the author intended with his genus. I am unable to see how a genus can be said to be '*defined*' by a type. For instance, *Papilio*, type *machaon*, means only a genus, which contains the species *machaon*, but leaves quite undecided whether such a genus comprises all organisms, all animals, all insects, all Lepidoptera, all butterflies, all hexapodous butterflies, all *Equites*, or only some greater or smaller part of the *Equites*, and is therefore not at all *defined*, and certainly much less defined than Linné's genus *Papilio*."

Replies to the first section of Question 3 were also received from seven other entomologists. An analysis of the whole number of replies shows that five were in favour of accepting the 'Tentamen' genera, and that six were opposed to their adoption.

With regard to the year in which the 'Tentamen' was published, it appears that Lord Walsingham, Dr. Staudinger, Professors Fernald, Grote, and Smith consider the date to be 1806; whilst Mr. Kirby is of opinion that publication did not take place until some time between the years 1807 and 1816.

The majority of the replies to Question 4 were in favour of accepting the genera of Hübner's 'Zuträge,' the actual numbers being seven for and four against.

5. ARE THE GENERA OF HÜBNER'S 'VERZEICHNISS' TO BE ACCEPTED OR NOT? IF ACCEPTED, WHAT DATE IS TO BE ASSIGNED TO THEM?

The Committee, with one possible dissentient, accepts the 'Verzeichniss' genera, but there is some difference of opinion as to the date of publication. It seems, however, to have been generally recognised by the nine members of the Committee who replied to this part of the question that the work was issued in serial form. Four of these replies set down the date of commencement as 1816, and all agree that the work was concluded by 1826 or 1827. Sir George Hampson is unable to find any evidence of portions of the 'Verzeichniss' having been published prior to the year 1826. He writes:—

"I am of opinion that the date assigned to the 'Verzeichniss' genera should be 1827, when Geyer published the collected work which Hübner had in part or perhaps wholly distributed in sheets at uncertain intervals during his lifetime, but never definitely published. If this date (1827) be assigned to it, the nomenclature based on it would have some possibility of permanence."

The settlement of Question 6 is largely one for philologists to finally decide, and we will dismiss it by simply quoting Lord Walsingham's reply thereto:—

"*iidæ* and *iinæ* are incorrect, and *ianæ* and *iadæ* should be used.

"The Committee of the British Association had no power to promulgate the employment of terms not orthographically written, and there is no evidence that they had such intentions. Whether they had or had not matters little; the question is orthographical, not zoological, and must be determined by laws of grammatical usage. The terminations *dæ* and *næ* must be accepted, but the preceding coincidence of vowels is merely circumstantial, and must be dealt with accordingly."

In the matter of Question 7, the unanimous opinion of the ten entomologists who expressed their views appears to be that—

"1. The type of a genus must be a species originally included in it by the founder.

"2. The type must conform to the original description of the genus (a species excluded by the description cannot be the type."

There are other and more complex matters connected with this question, and about these there is far less unanimity. Some other propositions have also been introduced, and it would therefore seem that the question must still continue an open one, except as regards the two propositions quoted above.

NOTES AND OBSERVATIONS.

Emydia cribrum in the New Forest.—The late Mr. Bond's own words, written in his interleaved copy of Stainton's 'Manual,' are as follows:—"Near Ringwood, in the New Forest, about two miles upon the Poole road, at a place called St. Lawrence, opposite the inn there." If this very definitely described spot is *misleading*, I must apologise to my friend Mr. Eustace Bankes; but, in the absence of personal knowledge of this old locality, I would suggest that two miles along the Poole road from a spot near Ringwood need not necessarily be in the Forest itself. The context of the situation of the public-house would supply the position near enough. There is no doubt that *E. cribrum* is even now spread over miles of country in apparently isolated communities, and there need be no mystery over a fact so well known.—Sydney Webb; 22, Waterloo Crescent, Dover, July 3rd, 1899.

Note on Cataclysta lemnata.—Some insects seem to have a remarkable power of discovering any little place that will suit them to live in, even though far away from their previous haunts. There is a cemented tank, about six feet by five feet in size, here in the garden, that is covered with duckweed, and there are some *C. lemnata* about it, both male and female. If the surrounding country was full of ditches and ponds and wet places it might be easily accounted for, but there is no stream nearer than a mile, and that is dry half of every year, and is far too swift when it does run for duckweed to grow on it. There are two horse-ponds that catch rain-water within three or four hundred yards, but curiously there is no duckweed growing on either of these. So these moths must have come a long way to find this little tank.—W. M. Christy; Watergate, Emsworth, Hants.

Entomology in Japan.—We have just received No. 5 of the third volume of the 'Insect World': a Monthly Magazine. Edited by Y. Nawa; and published in Gifu, Japan. With the exception of the words cited above, the journal is printed in Japanese character. The number, which comprises forty pages, has a well-executed plate representing structural details of some species of Hymenoptera; and there are several nice figures in the text.

Presentation to Miss Ormerod.—At the annual meeting, on June 25th, of the Société Nationale d'Acclimatation de France, M. Le Myre de Vilers, president, in the chair, the large silver medal of the Society, bearing the portrait of Geoffroy Saint-Hilaire, was decreed to Miss Eleanor A. Ormerod, of St. Albans, England, for her work in Economic, or Applied, Entomology. Miss Ormerod will be heartily congratulated by her numerous agricultural and other friends on the receipt of this distinguished mark of appreciation of her disinterested labours.

Aberrations of Zygæna filipendulæ and Z. trifolii near Ringwood.—It has often been remarked that young collectors are frequently more fortunate in their captures than their older and more experienced brethren, and many of us could verify the statement. Two young friends of mine—brothers—of the name of Bellarny, began collecting Lepidoptera last season, and as they bring most of their captures for my inspection, I have been rather surprised at their success. For instance, last autumn a specimen of *Colias hyale* was taken on the borders of the forest by one of the boys, and, although I had collected over the same ground many hundreds of times, I had but once seen the species alive anywhere in the neighbourhood. During the present season they have met with a yellow variety of *Z. filipendulæ*, and, more remarkable, a black variety of *Z. trifolii*. The former specimen is damaged, having lost a portion of the left hind wing, but the example of *trifolii* is a perfect gem, having been taken from a grass-stem before its wings were fully developed. From time to time the pages of the 'Entomologist' have been enriched by figures and descriptious of various forms of *trifolii*, but I do not recollect seeing such a specimen described as the one now under consideration. The fore wings are, in certain lights, of the usual glossy greenish black colour, but the spots, on close inspection, are conspicuous, appearing to be more thickly scaled and consequently more opaque than the rest of the wings; the borders of the hind wings are of the same greenish hue as the ground of fore wings, whilst that portion of hind wings usually red is of a dull smoky black, with slight indications of a darker central mark on inner margin. The body is black and somewhat "shaggy," and at some distance the whole insect appears to be of a uniform black colour. It is rather small in size, and on being placed side by side with normal *trifolii* its antennæ appear to be rather thicker; otherwise this interesting specimen is perfect.—G. B. Corbin; Ringwood, July 7th, 1899.

[The description of the aberrant *Zygæna* referred to above reminds one of *Z. filipendulæ* var. *chrysanthemi*, Esp. (*vide* Entom. xxiv. 234), and I consequently wrote to Mr. Corbin asking him if he was quite sure that the specimen had been correctly identified. His reply seems satisfactory upon the point. He was good enough to suggest that if I wished him to do so he would endeavour to obtain the example for examination. This I did not consider necessary, because if Mr. Corbin is satisfied that the insect is an aberration of *Z. trifolii*, I very much doubt whether I should be able to prove it otherwise. I may add that, so far as I am aware, there is no previous record of a similar aberration of this species.—R. S.]

CAPTURES AND FIELD REPORTS.

Macroglossa stellatarum in the Edinburgh District.—Mr. Wm. Evans, of Edinburgh, communicates the following note to the 'Annals of Scottish Natural History' (No. 31, p. 184, July, 1899):—"The humming-bird hawk-moth (*Macroglossa stellatarum*) has been more abundant in this neighbourhood this summer than I have ever seen it before. The first I heard of was taken in Peeblesshire on June 1st, and on the 3rd my friend Mr. P. H. Grimshaw captured one at wild garlic (*Allium ursinum*), in Roslin Glen. On the 10th I observed quite a number—certainly not less than fifteen to twenty—on the Fife coast between Burntisland and Kinghorn. Two which I netted were hovering over flowering patches of *Lotus corniculatus* on a sunny bank, but most of them were flying about the cliffs and rocky places where they could not readily be reached. Several times three, and once four, were in view at the same moment. After 4 p.m. they gradually disappeared, the last being seen shortly after six o'clock. The only flowers besides the *Lotus* that I saw them visit here were *Astragalus hypoglottis* and *Salvia verbenaca*. The next example I saw was on the Isle of May, on the 15th. On the 16th I again met with the insect, this time between Longniddry and Aberlady. They were flying about the high roadside wall at intervals for a distance of two miles; and at one place I caught six without moving more than a hundred yards. Altogether, I must have seen quite thirty on this occasion. The same day one was seen at Craiglockhart. In the forenoon of the 19th I noticed three, if not four, on Blackford Hill, and in the afternoon I found numbers careering about the rocks on Arthur's Seat. A similar outburst of this species occurred here thirty years ago (1868–1870)."

Another correspondent to the same journal states that "individuals of this species were attracted in large numbers to a rhododendron when in full bloom," in the Upper Clyde.

Unusual Abundance of Macroglossa stellatarum.—*M. stellatarum* seems this year to be extremely abundant. I have not previously seen it at Brighton, though it is common at Lewes. It seems to favour one wall very much, and is rarely seen elsewhere. I found one at Fulking, and one on the County Cricket Ground.—Alan Cardinall; 18, Cromwell Road, Brighton.

Abundance of Melanippe fluctuata.—This species, during the four years that I have been living in Upper Tooting, has always been fairly common in gardens, &c. This year it has been in great abundance, especially throughout the month of June. A large amount of variation was also exhibited, both as regards size and tint, as well as in the intensity of the markings.—Richard South; 100, Ritherdon Road, Upper Tooting, S.W.

Angerona prunaria at Wandsworth.—A male specimen of the typical form of *A. prunaria* was allured [whence?] by the attraction of electric light, and was captured, at East Hill, Wandsworth, on July 17th last.—H. Armstrong; 5, Kerrison Road, S.W.

Plusia moneta in Wiltshire.—Though rather late in the day, it may still be of interest to record that, while staying near Pewsey, in Wiltshire, three years ago, I took a specimen of *P. moneta* on the wing, not knowing at the time what it was; it was flying among the flower-beds in the garden, about dusk. I had not the opportunity of identifying the insect until the other day, when I had the privilege of looking through the wonderful collection of Mr. S. J. Capper, of Liverpool, in which I saw a very fine series, besides many other most interesting things. Mr. Capper tells me that at the time I took it the moth was far from common, but that it is appearing more and more each year. I think, however, that it has not before been recorded from Wilts.—J. S. Puckridge; The Vicarage, Castlemartin, Pembroke.

[*Plusia moneta* was brought forward as new to the British Fauna in 1890 (*vide* Entom. xxiii. pp. 254, 287, pl. iii. fig. 6).—Ed.]

Plusia moneta in West Sussex and in Kent.—I found two larvæ of *P. moneta* in the garden here this year, and I also obtained two near Westerham, in Kent. All have pupated, and one imago has emerged.—W. M. Christy; Watergate, June 21st, 1899.

Plusia moneta in Middlesex.—On the night of July 15th I netted a specimen of *P. moneta* in our garden; it was hovering over the flowers of *Silene inflata.*—J. F. Bird; 162, Dalling Road, Hammersmith, July 17th, 1899.

Plusia moneta in Hertfordshire.—On the night of July 18th last, I captured a splendid specimen of *P. moneta* in my light-trap.—Philip J. Barraud; Bushey Heath, Herts.

The Yellow Form of Zygæna trifolii.—I have only seen three or four yellow specimens of *Z. trifolii* this season.—W. M. Christy; Watergate, Emsworth, Hants.

Spring Moths and Larvæ: Chester District.—Among the wide grassy lanes branching off the high roads and among the fields, and almost choked in places by thick growths of bramble, dog-rose, and sallow, a friend and I began looking for early moths on the night of March 30th. Many of these green lanes are fast losing their character, if not their very existence—the gipsies, under the paternal hand of the County Council, now know them no more—and there is a clearance going on against bramble, briar, and sallow, much to the disadvantage of local Lepidoptera. Such, at any rate to a great extent, was the case of the particular lane we visited on the date mentioned. Still, there was a good deal of shrubbery left, and we consequently found *Anticlea badiata* fairly plentiful. *A. derivata* did not make its appearance till May 12th. This beautiful moth does not seem to be anywhere common. It is scarce, at any rate, in this district, although its food-plant (dog-rose) flourishes everywhere, and forms the pabulum for *A. badiata* as well. My friend Mr. Thompson, of Chester, took one on the date mentioned; another, June 5th; and I scored one, May 16th—total, three! Our collecting was done with the aid of lamps, and quite a stock of hybernated larvæ were secured from the sallows and blackthorns. Among these were *Triphæna fimbria*, *T. orbona*, *T. ianthina*, *Xylophasia polyodon*, and *Noctua augur*. This sort of collecting lasted till the 26th of May, when *A. badiata* fell off, the larvæ disappeared, and there was nothing on the wing but *Rumia cratægata*, *Hypsipetes elutata* (all dark forms), and *Coremia unidentaria*. The type, in which the broad central bar across the upper wings is black, or nearly so, was the commonest form of *C. unidentaria*, but the variety which has the bar, apical blotch, and other marks *reddish*—sometimes confused with *C. ferrugata*—was also taken. I have never seen the latter species in the district, although it occurs at Birkenhead, Wallasey sandhills, and Puddington (Mr. A. O. Walker's list). *A. badiata* also varied much, especially in depth of tint. Other moths were *Calocampa vetusta* (one, hybernated, taken off sallow bloom), *Xylocampa lithorhiza* (one only—another moth seldom seen here), *Tæniocampa gothica*, *T. stabilis*, *T. instabilis*, *T. gracilis*, *Diurnea fagella*, *Hybernia progemmaria*, and *Cidaria silaceata*. The weather was good, on the whole. The nights were often clear and starry, inclined to frost, and with a cold north-east breeze.—J. ARKLE; Chester.

CHŒROCAMPA PORCELLUS.—On June 12th I took a lovely specimen of the above, flying over the flowers of the red campion, in a lane about a mile out of the town; and on the 19th, two more specimens (male and female), within a few yards of the spot where the first was taken. Is not this rather an unusual capture for Warwickshire?—CHAS. BAKER; Long Street, Atherstone, June 26th, 1899.

HALIAS QUERCANA AT DULWICH.—On June 4th I found a larva on a fence bordering Dulwich College. After keeping it for five days it spun a cocoon, and seventeen days later on a specimen of *H. quercana* emerged.—STANLEY A. BLENKARN; Ivyholme, Dulwich Common, S.E.

NOTE ON DIANTHŒCIA CUCUBALI.—On July 24th last I took a specimen of *D. cucubali* at sugar, at Lewes. Is not this unusually late for this species? And is it not also very unusual for it to come to sugar? The specimen was in very fine condition, and evidently only recently emerged.—HUGH J. VINALL; Lewes, July 25th, 1899.

[This species is "double-brooded" on the Continent, and there is no doubt that it is so, occasionally at least, in Britain. The specimens occurring in August and late July are almost certainly derived from the May–June emergence. It has been previously noted as a visitor to sugar. —ED.]

SOCIETIES.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*June 22nd*, 1899.—Mr. J. W. Tutt, F.E.S., Vice-President, in the chair. Mr. Montgomery exhibited larvæ of (1) *Pararge megæra*; (2) *Epinephele tithonus*, from ova, showing brown and green forms; and (3) *E. hyperanthus*, from ova, and gave particulars as to their food-plant and their hybernation. He also showed a new arrangement he had made for sending larvæ by post. Mr. Turner, a cluster of large ova deposited on a spray of heather, closely resembling a head of the dead flowers, and afterwards found to be those of *Bombyx quercus.* Mr. West, a specimen of *Stauropus fagi*, bred from a larva found at West Wickham in 1898. Mr. Adkin, a fine specimen of *Syrichthus malvæ* var. *taras*, from Milton, Sussex; a cocoon of *Hylophila bicolorana* (*quercana*), and called attention to the special construction which gave it great power of resistance to external pressure; and he mentioned the fact of having seen a specimen of *Hepialus* wallowing in the dust of the road as sparrows do, and flying off when disturbed. Dr. Chapman, specimens of *Fumea intermediella*, bred, and made remarks on the brown and blackish forms; cases of a Psychid from Chili, with a curious internal structure for the support of the pupa; and cases and male examples of *F. crassiorella*, pointing the distinctive features of the species. Mr. Tutt, specimens of *Ephippiphora grandævana* from Hartlepool, with the curious long sand tubes, and described the movements of the pupæ. Mr. F. Noad Clark gave notes on photomicrography as applied to entomology, illustrating his remarks by photographs taken by himself.—Hy. J. Turner, *Hon. Rep. Sec.*

Birmingham Entomological Society.—*June 19th*, 1899.—Mr. P. W. Abbott, Vice-President, in the chair. Mr. R. C. Bradley showed series of *Andrena trimmerana* and *Nomada alternata*, which he had been taking commonly at Moseley; also specimens of *Chortophila buccata*, which he had found newly emerged, drying their wings outside the nests of the Andrenæ. Mr. P. W. Abbott, a nice little series of *Sesia sphegiformis*, which he had succeeded in breeding from Wyre Forest. He had caught one or two odd specimens there before, but had not previously found the larvæ. Mr. C. J. Wainwright, a number of Aculeate Hymenoptera, including *Andrena fulvicrus*, *A. thoracica* from Folkestone, *Nomada bifida* from New Forest, and many others.—Colbran J. Wainwright, *Hon. Sec.*

Carlisle Entomological Society.—*July 6th*, 1899.—Mr. James Murray in the chair. Mr. G. Wilkinson exhibited *Stigmonota dorsana*, *Eupœcilia maculosana*, *Dicrorampha saturnana*, *Adela rufimitrella*, from Wreay; *Amphisa prodromana*, from Castlecarrock Fell. *S. dorsana* was the fourth specimen that had been taken. Mr. J. Murray, the following Coleoptera: *Saperda populnea*, which was taken flying round aspen commonly; *Cryptorrhynchus lapathi*, from willow bushes on the banks of the Eden; *Elaphrus riparius*, which is locally common on the Eden; *Harpalus latus* var. *erythrocephalus*, and *Telephorus figuratus*. Mr. F. H. Day, *Bledius spectabilis; Telephorus darwinianus*, from Burgh; *Carabus nitens*, from Brackenber Moor in Westmoreland. Mr. G. B. Routledge, *Bradycellus cognatus* and *B. collaris*, from Castlecarrock Fell; *Bembidium schuppeli*, from the banks of the River Irthing, a local northern species, first taken by the late Mr. T. J. Bold in the same district.—G. B. Routledge.

RECENT LITERATURE.

Insects, their Structure and Life: a Primer of Entomology. By George H. Carpenter, B.Sc.Lond. 8vo, pp. xii, 404, illustrated. London: J. M. Dent & Co. 1899.

The literature treating of the subject of entomology has become so extensive that it is hardly possible for the average student to keep himself quite posted up to date. A work therefore which, in a comparatively small compass, gives a comprehensive digest of the latest additions to our knowledge should certainly be accepted as a distinct boon.

The author of the volume under notice is to be congratulated on the very able way in which he has dealt with the large amount of material at his command, presenting us with an epitome of the work and teachings of present-day morphologists, biologists, and systematists. The book comprises six chapters, as follows:—1. The Form of Insects; 2. The Life-history of Insects; 3. The Classification of Insects; 4. The Orders of Insects; 5. Insects and their Surroundings; 6. The Pedigree of Insects. There is also a very full bibliography and a convenient index.

The class is divided into fifteen orders, and these are considered as here enumerated:—Collembola, Thysanura, Dermaptera, Orthoptera, Platyptera, Thysanoptera, Hemiptera, Plectoptera, Odonata, Neuroptera, Coleoptera, Trichoptera, Lepidoptera, Diptera, Hymenoptera.

The relationship of the orders is discussed at some length in chapter 6.

In discussing the classification of insects (chapter 3) our author remarks (pp. 157–159), under the sub-heading "The Search for a Natural Classification":—

"It will have been evident to the reader of this chapter that insect classification is a more or less uncertain thing. The limits which mark off species, genera, families, and even orders, from each other depend largely upon the judgment and opinion of the naturalist. Butterflies and moths may be easily enough distinguished from cockroaches, but some of them show a remarkable likeness to caddis flies. This difficulty in classification is just what we should expect, if, as we believe is the case, all insects are really related to each other. We are able to draw hard and fast lines between some groups because in the course of ages they have diverged far from their common stock. But the more nearly related insects are, the more difficult do we find it to make them fit into the divisions that we have made for their reception. Could a naturalist have before him all the insects which live or ever have lived on the earth, his divisions would entirely break down, and his system of species, genera, families, and orders would become lost in a well-nigh indefinable gradation of characters. The object of the classifier is so to arrange the insects which he does know that they may fall into their right positions with regard to those vanished races that must once have formed the connecting links between them. The truly natural classification of insects is that which will place them on their right branches of the great tree of animal life. The labours of the classifier are usually presented in the form of lists or catalogues;

and no linear arrangement—genera, families, orders, following one after the other—can exactly express the true relationships between the groups, which must necessarily show affinities in various directions. But in striving after a natural system, making use in his work of all that he can learn of the inner and outer structure and development of the creatures which he classifies, the systematist is doing his part to read the *history* of insects in the widest sense of the term. And he will, if wise, hold with a light grasp to his systematic divisions, recognising that the increased knowledge which makes the line between two species or two orders appear blurred and uncertain, throws a clearer light on the object of all entomological work, which is to trace the course of evolution in insect life."

Mr. Carpenter is of opinion that the old style division of the Lepidoptera into Rhopalocera and Heterocera is not scientific, and in this view he is in accord with most recent authors. He, however, also objects to the divisions Jugatæ and Frenatæ, proposed by Comstock; to the Incompletæ and Obtectæ, of Chapman; and to Packard's Haustellata with Laciniata as a sub-order. In rejecting all divisions between the order and the family he is in unison with Hampson. The families adopted are forty-seven in number, and are briefly referred to in the following sequence:—Micropterygidæ, Eriocraniidæ, Hepialidæ, Zygænidæ, Chalcosiidæ, Limacodidæ, Castniidæ, Megalopygidæ, Psychidæ, Heterogynidæ, Cossidæ, Sesiidæ, Tortricidæ, Tineidæ, Pterophoridæ, Orneodidæ, Pyralidæ, Thyrididæ, Drepanulidæ, Callidulidæ, Lasiocampidæ, Lymantriidæ, Hypsidæ, Arctiidæ, Noctuidæ, Argaristidæ, Syntomidæ, Thyatiridæ, Notodontidæ, Sphingidæ, Dioptidæ, Geometridæ, Epiplemidæ, Uraniidæ, Epicopiidæ, Bombycidæ, Eupterotidæ, Ceratocampidæ, Brahmæidæ, Saturniidæ, Hesperiidæ, Lycænidæ, Lemoniidæ, Libytheidæ, Papilionidæ, Pieridæ, Nymphalidæ.

We have great pleasure in bringing this work to the attention of our readers, as we are sure that it will prove to some of them exactly the book they have been anxious to obtain. It is liberally illustrated, well arranged, and printed, and the price is exceedingly low.

The Quince Curculio. By M. V. Slingerland. Bulletin 148. Cornell University Agricultural Experimental Station. Pp. 695–715. Illustrated. Ithaca, N.Y. May, 1898.

U.S. Department of Agriculture, Division of Entomology, Bull. 19. *Some Insects Injurious to Garden and Orchard Crops.* A series of articles dealing with insects of this class. By F. H. Chittenden. Pp. 100. Illustrated. Washington. 1899.

Contributions toward a Monograph of the Noctuidæ of Boreal America: Revssion of the Genus Hydræcia. By John B. Smith, Sc.D. Pp. 48, 2 plates. Reprint from Transactions, American Entomological Society, xxvi., May, 1899.

The Coccidæ of Kansas. By S. J. Hunter. Pp. 11, 5 plates. Reprint from Kan. Univ. Quar. viii., April, 1899, series A.

Report on the Work of Exterminating the Gypsy Moth. By C. H. Fernald and E. H. Forbush. Pp. 71, 12 plates. Massachusetts State Board of Agriculture. January, 1899.

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ON THE NOMENCLATURE OF THE RHYNCHOTA.—Part 1.

By G. W. Kirkaldy.

Young entomologists commencing the study of the Rhynchota are doubtless often discouraged, when extending their labours beyond British forms, by the chaotic condition of the nomenclature; although the specific names are fairly well fixed—as much so as one can expect for artificial conceptions—the generic names seem to have no stability, and one has sometimes to spend more time in hunting up references and working through piles of volumes and pamphlets than in actual examination of the insects themselves.

In some orders, where a very similar condition of things prevails, there is good excuse, as, for example, in the Lepidoptera, where the leading authorities are not at all in accord as to whether certain works are to be accepted or not. In the Rhynchota there appears to be (except in a few isolated cases) *no such excuse whatever.* I have carefully examined all the literature of the Heteroptera (of which I am cognisant), up to 1810, and I know of two genera only in which the type cannot be *indubitably* fixed, according to the strict law of priority.

I am aware that with many men it is the custom to sneer at what are termed "antiquarian researches," but I am convinced that, until the nomenclature of the genera is tolerably well and *safely* fixed, anatomical and biological investigations can only be conducted with an unnecessary amount of extraneous trouble.

O. M. Reuter has already, in a monumental work,* settled definitely a great number of genotypes, and although in a few cases I find his results open to question—and these are when he has avoided the strict application of the rule—my researches convince me that his main conclusions are perfectly correct. It would have been unnecessary to make such a remark, were it not that three important works by serious rhynchotists* have been published (subsequent to the 'Revisio'), in whichReuter's results have been almost entirely ignored.

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* "Revisio synonymica Heteropterorum palæarcticorum, &c.," in 'Acta Soc. Sci. Fennicæ,' 1888, xv. pp. 241-313 and 443-812.

In consulting these works, moreover, I have been unable to appreciate the method by which the names of the families and subfamilies are appropriated; for instance, on p. 45 of Puton's 'Catalogue,' the first tribe of the "Reduvides" is given as "Emesini." Why? Is *Emesa* a more typical genus than *Ploiariola* or *Ploiaria?* It seems to me that the only satisfactory and uniform method—in the present state of our knowledge—is to take the genus founded earliest, and form from that the family, &c., names; *i. e.*, *Ploiaria*, dating from 1786, is the oldest—in its subfamily—and that subfamily should then be known as PLOIARIINÆ (or tribe Ploiariini). *Reduvius*, 1775, is the oldest genus in the whole family, so that the latter is, as usually termed, REDUVIIDÆ. On the other hand, *Miris*, 1794,† antedates *Capsus*, 1803, by nine years, and the family should be known as MIRIDÆ.

1. Linnæus founded in the 'Systema Naturæ,' ed. 10, 1758, three heteropterous genera; viz. *Cimex*, *Nepa*, and *Notonecta*. As the types of the two last (i. e. *N. cinerea* and *N. glauca*) are not disputed, it is unnecessary to dwell upon them. Eighty-three species are included in *Cimex*, but it was not broken up till Fabricius in 1775, 'Systema Entom.,' removed several species to found *Acanthia* and *Reduvius*.

The type of *Cimex* must be among the Linnean species left therein by Fabricius, and cannot therefore be *C. lectularius*, removed by the latter to *Acanthia*.‡

Reuter has indicated *personatus*, Linn., as the type of *Reduvius*, Fabr. (Lamarck, 1801), and this seems to be generally accepted. He also indicates *zosteræ*, Fabr., and *littoralis*, Linn., as the types of *Acanthia*, Fabr., but as this has been accepted neither by Saunders, Leithierry and Severin, nor Puton, nor yet by Horvàth,§ it may be worth while to recapitulate the reasons for this step. *Acanthia*, Fabr., 1775, contained a heterogeneous assemblage, but it was not till 1797 that Latreille indicated *littoralis* and its congeners as the types of the genus. It is, I think, indisputable that (1) *Acanthia* was not broken up, nor was any type fixed, till 1797; and (2) that Latreille did fix the type. I therefore see no alternative to adopting the name *Acanthia* for *littoralis*, &c., as Reuter has already done in his monograph of the palæarctic species.

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* Edward Saunders, 1892, 'Hemipt. Heteropt. British Islands'; Lethierry & Severin, 1893–96, 'Catal. général Hémiptères,' i.–iii.; A. Puton, 1899, 'Catal. Hémiptères paléarct.,' ed. 4.

† "1771," by printer's error in the 'Revisio,' pp. 613 and 764.

‡ This result is unaffected by any subsequent type-fixations or new genera; for example, *C. lectularius* was wrongly fixed by Latreille in 1802 as the type of *Cimex*. Dr. Reuter remarks (p. 268): "Dass Latreille . . . . für diese Art den Namen *Cimex* aufnahm, scheint mir nur ein Zeugniss seines guten Tactes zu sein." The learned Doctor is doubtless endowed with a very subtle gift of irony, as I fail to see any display of "tact" in committing an error which has caused nearly a century of nomenclatural confusion, and left the commonest bug without a proper name.

§ 1898, 'A magyar birod állatv. Hemipt.' (1897), p. 43.

For *Cimex lectularius*, Linn., I now propose the generic name Klinophilos (with genotype *lectularius*).

From the remnants of *Acanthia* have been formed, up to 1803, *Phymata*, Latr., 1802; *Aradus*, Fabr., 1803, of which Reuter has indicated the types; and *Tingis*, Fabr., 1803, of which Reuter cites "*Acanthia pyri*, Fabr.," as the type. This is, however, incorrect, *T. cardui* (Fabr.) having been indicated by the founder of the genus (p. 125).

2. In 1762 Geoffroy erected two genera—*Naucoris* (type [*cimicoides*, Geoffr. nec Linn. =] *maculata*, Fabr.) and *Corixa* (type [*striata*, Geoffr. nec Linn. =] *geoffroyi*, Leach).* *Sigara*, Fabr. 1775, is synonymous with *Corixa*, Geoffr.

The next publication was Olivier's contribution, in 1789, to the 'Encyclopédie Méthodique,' vol. iv. In this precious volume a "new" genus, *Pentatoma*, was "founded," though very feebly diagnosed, and without mention of species or type.

As the work is, I believe, rare, it may be interesting to some rhynchotists to read the original descriptions:—

"No. 59. *Cimex*, Linn. Geoffr. Fabr. *Acanthia*, Fabr.—Antennes filiformes, composées de quatre articles très distincts. Trompe recourbée sous la poitrine, creusée en goutière, & contenant trois soies. Trois articles aux tarses. *Corps alongé, rarement ovale, souvent déprimé.*

"No. 60. *Pentatoma Cimex*, Linn. Geoffr. Fabr.—Antennes filiformes, composées de cinq articles cylindriques. Trompe recourbée sous la poitrine, creusée en goutière, & contenant trois soies. Trois articles aux tarses. *Corps souvent ovale.*"

That is to say, the only workable difference between the two is that *Cimex* has four-segmented antennæ, *Pentatoma* five. Fabricius, in 1794 (Entom. Syst. iv.), splits up *Cimex* into five genera, *Cimex* itself being reserved for the forms now known as "Pentatomidæ" in the widest sense. Now, if *Pentatoma*, Oliv., as *subsequently* fixed by Lamarck in 1801 (note, twelve years after its original proposal), is allowed to be valid, I fail to see how the type of *Cimex* can be fixed. *Pentatoma*, Oliv., 1789, if it has any value at all, is equivalent to the "Pentatomidæ" as a whole (that is, to *Cimex*, Fabr., 1794); but Olivier's definitions of the two genera appear to me utterly worthless. *Pentatoma* was disregarded altogether by Fabricius both in 1794 and 1803, and was considered synonymous with *Cimex* by Latrielle in 1797.

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* I do not know why Reuter places Geoffroy's "Histoire abrégée des Insectes" in the *first* part of his 'Historische Uebersicht,' *viz.* "Arbeiten, in welchen die binäre Nomenclatur nicht durchgeführt ist"!!

The antennæ in the majority of the "Pentatomidæ" have certainly five segments, but a large proportion have only four, and a few three. Moreover, Olivier's definition of *Cimex* does not accord with that of Fabricius, 1775 (legitimately modified from Linnæus), and does not suffice for the remainder of Fabricius's *Cimex* after the removal of the "Pentatomidæ." Furthermore, there is no indication of types nor mention of species in either. I propose therefore to treat "*Pentatoma*, Olivier," as a *nomen nudum*, and disregard it altogether as a nomenclatural factor at 1789, but hold it in suspense till 1796, when it is ranked as a synonym of *Cimex* by Latrielle.

3. The types of the four genera removed by Fabricius from *Cimex* in 1794 were fixed by the founder as follows:—

213. *Coreus*, type *scapha* (Fabr.).
214. *Lygæus*, type *valgus* (Linn.).
215. *Miris*, type *dolobratus* (Linn.).
216. *Gerris*, type *lacustris* (Linn.).

The first three are not generally accepted.

Coriscus, Schrank, 1796 (type *dauci*), remains unidentified, but the types of the other genera not previously mentioned, erected between 1786 and 1803, are as indicated by Reuter, except that the type of *Cimex* is recorded on p. 301 as "*nigrideus*," whereas it is "*bidens*, Linn."

The following will demonstrate the synonymy I now propose, which is really almost an entire return to the nomenclature adopted by Stål in the opening volumes of the 'Enumeratio':—

1. CIMEX, Linn., 1758. Type, *bidens*, Linn., Fabr., 1803.

2. PENTATOMA, Oliv., 1789. Valueless [ranked as syn. of *Cimex*, 1797.]

3. LYGÆUS, Fabr., 1794=*Holopterna*, Stål, 1873, and modern authors. Type, *valgus* (Linn.), Fabr.

4. TINGIS, Fabr., 1803=*Philontochila*, Fieb., and modern authors. Type, *cardui* (Linn.), Fabr.

5. KLINOPHILOS, Kirkaldy, 1899=*Cimex* of some modern authors=*Acanthia* of others. Type, *lectularius* (Linn.), Kirk.

From this follows the synonymy as below:—

1. CIMICIDÆ = Pentatomidæ, auct.
2. LYGÆIDÆ = Coreidæ, auct.
2*a*. Lygæinæ = Mictinæ, auct.
2*b*. Coreinæ = Centroscelinæ, auct.
3. MYODOCHIDÆ = Lygæidæ, auct.
3*a*. Astacopinæ = Lygæinæ, auct.

4.[*] Macrocephalidæ = Phymatidæ, auct.
5. Miridæ = Capsidæ, auct.
6. — ? — = Cimicidæ, auct.

I have not thought it necessary to enumerate the changes desirable in a large number of other subfamilies.

THE TYPE OF THE GENUS *HYPOLYCÆNA.*

By A. G. Butler, Ph.D.

In the 'Wiener Entomologische Monatschrift' for 1860, Felder described a new Lycænid under the name of *Myrina thecloides*, and, in a footnote, he remarked, "This species and its allies, *M. erylus*, Godt., and *M. sipylus*, Feld., differ from the Myrinas in having the second joint of the palpi shorter than the head, the third long, aciculate, arched, the antennæ moderately clubbed."

In the same Journal, two years later, he refers back to this description (to which he adds that the antennæ are clearly but distantly annulated), and he gives to the group the name *Hypolycæna*, adding to it three additional species.

Now it stands to reason that, *M. thecloides* being the only species to which the original description was referred, the fact that no name for the genus was proposed until 1862, cannot prevent *M. thecloides* being its type, and it is manifestly a blunder to recognize any of the three species referred to as "tribus ulterioribus speciebus" as the type of a description written befere they were received.

Dr. Scudder was the first to fall into error, when he stated that *H. tharrytas* might be taken as the type; whilst, later, Dr. Moore equally incorrectly indicated *H. tmolus*: the latter is indeed congeneric with *H. thecloides* and with *H. erylus*, although it possesses a far better defined male sexual patch on the primaries than either of them.

Without personal critical comparison of all the structural characters, I am not (at present) prepared to accept all the African forms as belonging to the genus: they may do so.

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[*] *Macrocephalus*, Swederus, 1787, antedates *Phymata*, Latr., 1802.

A CONTRIBUTION TO THE ENTOMOLOGY OF NORTHAMPTONSHIRE.

By Claude Morley, F.E.S., &c.

Is there no one in the whole of broad Northamptonshire who collects Moths and Butterflies? Nay, this cannot be, in view of the existence of the Northampton and of the Peterborough Natural History Societies. Let him arise then and awake to the fact that he can make for himself a name—not a great one, but that of an authority upon a subject within a limited area; and who's is more? There is, says my friend Mr. C. G. Barrett (Ent. Mo. Mag. 1897, p. 193), no list of the Lepidoptera of Northants. In these deplorable circumstances, may I be permitted to place a few of my schoolboy reminiscencies upon record? I have never publicly acknowledged my obligations to William T. Hill, of Peterborough, for his good fellowship in the early days of my entomology—the days, as Green says, when everything is rare. Mr. Hill could, doubtless, tell far more of the Lepidoptera of his neighbourhood than I, but unfortunately, as a wag recently remarked, he has "degenerated" from a buggist to an editor, and now, I fear, has deserted his ancient love of things crawling. This being so, I mention, with the keenest appreciation of the paucity of the data and ubiquity of the species enumerated, such as I can recall of those then treasures, as a small and insignificant basis for a county list—a mere twig in that vast forest of insect fauna which must exist, and only needs the working, in so fertile and well-wooded a county. I began to cross the confines of the Science in 1887, and in the Augusts of 1888–92 I noted the following species in the vicinity of Peterborough, with a few additions from Mr. Hill's collection:—

Pieris brassicæ, *rapæ*, and *napi; Euchloë cardamines*, common; *Gonepteryx rhamni*, females unusually common at Barnwell Wold and Marholm in August; *Colias edusa* and *C. hyale* both occurred at Helpston Heath during the great 1892 year; *Argynnis paphia* and *adippe*, somewhat common at Helpston Woods; *A. aglaia*, common among very rough grass outside the wood; *A. euphrosyne* and *A. selene* were both taken in the same locality by Mr. Hill; *Vanessa urticæ*, *io*, and *atalanta*, common; *V. polychloros* at Barnwell Wold and Peterborough sparingly,—I have found the pupa at Marholm; *V. cardui*, widely distributed and uncommon; *Apatura iris* was said to occur at both Helpston Heath and Barnwell Wold, but I never saw it, nor do I know of authentic records; *Melanargia galatea*, very abundant among long dry grass in a very rough field at Helpston, and I have also seen it at Sutton Heath in 1890; *Pararge egeria* and *megæra*, *Epinephele ianira*, *tithonus*, *hyperanthus*, and *Cænonympha pamphilus*, common; *Thecla quercus* and *rubi* both occurred at Helpston Heath; *Polyommatus phlæus* was common, especially in the fens about Yaxley and Holme, where the specimens were of unusual size and depth of colour; *Lycæna* *agestis* and *icarus*, common; *L. corydon*, exceedingly abundant in a disused stone quarry (not on chalk) near Helpston Heath; Mr. Hill took *Nemeobius lucina*, *Thanaos tages*, and a few *Carterocephalus palæmon* at Helpston in 1891; *Hesperia linea* and *sylvanus*, common.

Sphinx ligustri and *Chærocampa elpenor*, uncommon; *Smerinthus populi* and *tiliæ*, common in the larval condition; *S. ocellatus*, scarcer; *Zygæna filipendulæ* and *loniceræ*, which were very partial to Scotch thistle heads (*Onopordon*), common at Helpston Heath; *Lithosia lurideola; Euchelia jacobææ* was abundant upon the *Senecio* in stone quarries; *Arctia caia*, *Spilosoma lubricipeda*, *S. menthastri*, common; *Hepialus humuli*, *sylvanus*, *lupulinus*, and *hectus* all occurred sparingly at Peterborough; *Zeuzera pyrina*, of which a fine female had been captured at Barnwell Wold; *Porthesia similis*, *Leucoma salicis*, common; *Dasychira pudibunda*, at Borough Farm in the fens; *Orgyia antiqua*, common; *Bombyx neustria* and *Odonestis potatoria*, common at light.

Drepana hamula, flying about oaks at Helpston; *Cilix glaucata*, at light in the houses; *Dicranura vinula* and *Phalera bucephala*, larvæ common; *Pterostoma palpina*, at street lamps, uncommon.

Bryophila perla, *Acronycta tridens*, at light; *A. rumicis*, larvæ at Peterborough in 1890; *Leucania pallens*, *Hydræcia nictitans* and *micacea*, at light; *Axylia putris*, uncommon; *Xylophasia rurea* (one), *lithoxylea*, and *monoglyphica*, common; *Charæas graminis*, common upon flowers of *Senecio jacobæa* at Helpston Heath; *Cerigo matura* (once or twice), *Luperina testacea*, *Mamestra brassicæ* and *persicariæ*, *Apamea didyma*, *Miana furuncula* and *arcuosa* (once), *Caradrina blanda*, all at street lamps; *Agrotis saucia* and *porphyrea*, one each, in street lamps; *A. exclamationis*, *Noctua umbrosa*, *augur*, and *xanthographa*, at light; *Triphæna interjecta*, flying uncommonly among furze bushes (*Ulex*) at Helpston Heath in 1890 and 1891; *T. comes* and *T. pronuba*, at light; *Amphipyra pyramidea*, at Helpston and Peterborough; *A. tragopogonis* and *Mania typica*, on sugar at Waternewton, together with *Dianthœcia cucubali; D. carpophaga*, Peterborough; *Polia flavocincta*, *Agriopis aprilina*, *Plusia chrysitis* and *gamma*, at light; *Gonoptera libatrix*, Peterborough; *Euclidia glyphica* was taken by Mr. Hill at Helpston Heath in June, 1891.

Geometræ were not enthralling in those days, and I only noticed *Selenia illunaria*, *Crocallis elinguaria*, *Ennomos tiliaria*, *Boarmia gemmaria*, *Halia vauaria*, *Eupithæcia vulgata*, all common at light; *Strenia clathrata* at Marholm and Helpston Heath; *Fidonia atomaria*, *Abraxas grossulariata*, at Peterborough; *Lomaspilis marginata*, Borough Farm, in fens; *Hypsipetes sordidata*, *Melanippe fluctuata*, *Coremia ferrugata*, *Camptogramma bilineata*, *Cidaria russata*, all common; *C. dotata*, uncommon at Peterborough; *Eubolia mensuraria* and *palumbaria*, in the frequent stone quarries towards Helpston.

Of Micros we knew nothing, but I distinctly remember *Alucita hexadactyle* being unusually frequent in the house.

Of then unworked orders I still possess *Donacia sparganii* from reeds on the bank of the Nen; *Locusta viridissima* from a meadow near Walton Station; *Chrysis ignita* on a stone wall; and *Abia fasciata* on a flower—probably *Heracleum spondylium*—both at Helpston Heath, in August, 1889.

In this connection, I may mention that during a flying visit to Helpston Heath on February 24th, 1896, I noticed many empty cocoons, and obtained one containing a larva of *Sesia apiformis* in aspens at Marholm; and among Coleoptera were:—*Leistis spinibarbis*, hibernating in an old stump; *Oxytelus rugosus*, and *Choleva nigricans*, *in stercore; Priobium castaneum*, unusually common in a dead hawthorn stump; and *Erirrhinus vorax*, not rare, beneath aspen bark. The only Diptera seen were *Œcothea fenestralis*, sitting commonly on the walls of a cave in a stone quarry with a blue Tachinidæ, which Dr. Meade fails to recognise.

Ipswich; August, 1899.

THE ENTOMOLOGICAL CLUB.

(Concluded from p. 164.)

August 15*th*, 1844.—Trustees' letter of thanks to Club for "interesting and valuable present of insects." Mr. Doubleday instructed to obtain from Mr. Newman and other quarters the remainder of the property of the Club, that it might be brought together under his care: "Resolved, that it was expedient that steps be taken for obtaining from the British Museum those specimens of British and reputed British insects which it has been understood would be given to the Club from among the duplicates there."

September 19*th*, 1844.—Mr. Doubleday authorised to purchase four to six specimens of *Hipparchia melampus* (*Erebia epiphron* var.), then just recently discovered in Scotland by Mr. Weaver.

October 17*th*, 1844.—Purchase of an additional cabinet discussed and adjourned to next meeting. (November 21st, 1844.—Cabinet question again adjourned.)

December 19*th*, 1844.—Unanimously resolved that a new cabinet of twenty drawers be made to match the two at present belonging to the Club.

October 16*th*, 1845.—New cabinet reported to be nearly completed, and Treasurer authorised to pay for it when received by the Curator. (Paid 1845, see account-book.)

February 19*th*, 1846.—Plan of arranging the insects belonging to Club discussed. It was finally decided to commence with the Coleoptera, and "to confine them as closely as possible to twenty drawers, and that the arrangement be continued on the same scale, leaving it to be ascertained hereafter whether, at that rate, the whole collection may be arranged in the hundred drawers at present belonging to the Club, or whether more may be required."

May 21*st*, 1846.—Cabinets, collections, &c., reported to have been removed to the Curator's new residence—8, Spencer Place, Brixton Road.

So far as shown by the minute-book no mention was made of the Club's collection or other property at any meeting between that last referred to and June 15th, 1848, when Mr. Doubleday, as Curator, was authorised to supply a member with ten mahogany boxes belonging to the Club, at the sum of seven shillings apiece.

November 16*th*, 1848.—It was announced that the insects promised by the British Museum authorities had been received, and were then deposited in the cabinets of the Club.

On the death of Mr. Edward Doubleday in 1849 Mr. Walker was appointed Curator, and the Club's effects were removed to Bedford Square. On January 17th, 1850, the Curator reported that the property of the Club then under his charge consisted of two forty-drawer mahogany cabinets, and one mahogany cabinet of twenty drawers, "but that from the latter one drawer had been removed and was missing; also a number of insects in a deal mahogany cabinet belonging to Mr. Newman; but that no books or boxes of insects had been delivered"; and on May 16th of the same year he submitted the following statement:—"I have nearly finished the arrangement of the Coleoptera, and have placed in the cabinets the Orthoptera, Neuroptera, Hymenoptera, Hemiptera, and that portion of the Diptera which were not previously arranged. I have commenced labelling the Lepidoptera which require partial rearrangement. I have transferred some duplicates and some exotic species from the cabinets to my own boxes, and will give them up as soon as required. In conclusion, I will remark that my correspondence with entomologists will enable me to add to the collection, and would suggest the purchase of 'Curtis's Guide' as a means of ascertaining the number of the species and probably of much increasing them."

According to the report read at a meeting on May 17th, 1851, it would seem that the arrangement of the Diptera had been proceeded with, and that "very many species" had been added to the collection. It was also stated that a copy of 'Curtis's Guide' had been procured, and that most of the species in the possession of the Club had been marked off in it. In October, 1852, Mr. Walker intimated to the Club that as he was removing to Chepstow he was unable to keep the cabinets in Bedford Square, and the matter was then discussed, and its further consideration deferred to the next meeting (November 20th), when it was stated "that Mr. Walker had consented to withdraw his resignation of the Curatorship, and that arrangements were in progress for the location of the cabinets and for making them useful to entomologists generally; the details would be laid before the next meeting."

As mentioned in the previous account of the Club (Entom. xxv. p. 6), the collections passed into the custody of Mr. Edward Newman at the end of 1852, and remained under his charge until the time of his death (1876). They subsequently came under the care of Mr. Lowne, and are still in that gentleman's possession.

It will be seen by the extracts from the minute-book (1841–1851) given above that the exotic portion of the collection was disposed of, so that the cabinets, when deposited with Mr. Newman, contained only British species. The collections were subsequently enriched during the twenty-four years that Mr. Newman was the Curator. Mr. Lowne has now had the charge of the property of the Club for about twenty-three years, but during this period there are few recorded gifts to the Club. The chief *items* are the following:—

November 22*nd*, 1876.—A copy of Swammerdam's 'Natural History,' which had been presented to Mr. Newman by Mr. Joshua Brown, of Cirencester, was presented to the Entomological Club by Mrs. Newman, and the book was ordered to be placed in the hands of the Curator.

October 26*th*, 1881.—Mr. Brown presented the Club with a copy of Goedart's 'Entomology,' published in 1635.

It is to be hoped that these collections of British insects may again become available for general study. Almost quite recently there was a report that they were to be deposited with one of the London local societies, and so would be accessible to all entomologists. If this could haply be effected, the arrangement would certainly be quite in accord with the intentions of the original founders of these historic collections.

SOME NEW ENTOMOLOGICAL BOOKS.

Insects. Part II. By David Sharp, M.A., M.B., F.R.S., &c. 8vo. Pp. i–xii, 1–626. Illustrated. London and New York: Macmillan & Co. 1899.

The present volume is the sixth of the Cambridge Natural History. In our notice of the first part of Dr. Sharp's important work (Entom. xxix. 71), we mentioned that the orders recognised by the author were nine in number. Of these Aptera, Orthoptera, Neuroptera, and a portion of the Hymenoptera were treated in the former volume; the remainder of the Hymenoptera, together with Coleoptera, Lepidoptera, Diptera, Thysanoptera, and Hemiptera are considered in the volume before us. The divisions of Hymenoptera now discussed are the Tubulifera and the Aculeata, these being the second and third series of the suborder Petiolata.

The Coleoptera are divided into six series as follows:—Lamellicornia, Adephaga, Polymorpha, Heteromera, Phytophaga, and

Rhynchophora. With regard to the composition of series 3, Dr. Sharp says:—"We are obliged at present to adopt upwards of eighty families; and we are able to distinguish on positive characters five series. This leaves a large number of forms still unclassified, and these we have here associated with a sixth series, which we have called Coleoptera Polymorpha. This series corresponds with the two series called in books Clavicornia and Serricornia. As it is admitted to be impossible to define these two series, we think it much better to act accordingly, and to establish for the present a great group that can only be characterised by the fact that its members do not belong to any of the other five series. No doubt a larger knowledge of development, coupled with the advance of comparative anatomy, will ultimately bring about a better state of affairs." The Strepsiptera are included provisionally in Coleoptera.

Structure, embryology, metamorphosis, &c., of insects, were fully discussed in a general way in the first five chapters of the previous portion of this work, but these subjects are further entered upon in reference to each order independently. Thus, in his remarks on the external structure of Lepidoptera, Dr. Sharp states with regard to the divisions of the thorax:—"The prothorax is very small, being reduced to a collar, between the head and the alitrunk, of just sufficient size to bear the front pair of legs. Its most remarkable feature is a pair of processes, frequently existing on the upper surface, called 'patagia.' These, in many cases (especially in Noctuidæ), are lobes capable of considerable movement, being attached only by a narrow base. In *Hepialus*, on the contrary, they are not free, but are merely indicated by curved marks on the dorsum. The patagia are styled by many writers 'tegulæ.' They are of some interest in connection with the question of wing-like appendages on the prothorax of Palæzoic insects, and they have been considered by some writers to be the equivalents of true wings. The mesothorax is very large, especially its upper face, the notum, which is more or less convex, and in the higher forms attains a great extension from before backwards. . . . . . In addition to the front pair of wings the mesothorax bears on its upper surface another pair of appendages, the tegulæ. In the higher forms they are of large size; they are fastened on the front of the mesothorax, and extend backwards over the joint of the wing with the body, being densely covered with scales, so that they are but little conspicuous. These appendages are frequently erroneously called patagia; but have also been called scapulæ, pterygodes, paraptera, and shoulder-tufts or shoulder-lappets."

Discussing the methods of referring to the wing neuration of Lepidoptera, Dr. Sharp is of opinion "that no system satisfactory from a practical as well as from a theoretical point of view has yet been devised."

In his observations on larva of Lepidoptera, he remarks:—"The front legs are usually called the true legs, the others prolegs; but this latter designation is a most unfortunate one, the term 'pro' being in entomology used to signify anterior. It is, therefore, better to call the three anterior pairs thoracic legs, and the others abdominal feet, distinguishing the hind pair of these latter as claspers. There is, too, an unfortunate discrepancy amongst entomologists in their manner of counting the body-segments; some count the head as the first segment, while others apply this term to the first thoracic segment. The latter is the more correct course, for, as the head is not a single segment, it should not be called such in a terminology that affects to be morphologically exact, not simply descriptive."

The Lepidoptera are here treated in the usual two divisions, *i. e.*, Rhopalocera and Heterocera. Six families—namely Nymphalidæ (eight subfamilies), Erycinidæ (two subfamilies), Lycænidæ, Pieridæ, Papilionidæ, and Hesperiidæ—are included in the first division or series; but Dr. Sharp would seem to hold the opinion that the first three families are so closely related that they might be allied in one group.

The Hesperiidæ he considers to be more nearly allied to the Heterocera than to the Papilionidæ; and he states that "when the classification of Lepidoptera is more advanced, so that the various natural groups placed in that suborder are satisfactorily distinguished, it is probable that the Hesperiidæ will be altogether separated from Rhopalocera." He does not suppose, however, that lepidopterists will be inclined to accept "the family as a suborder equivalent in value to all Heterocera."

The number of described species of butterflies, Dr. Sharp says, "is probably about 13,000"; and he adds—"but the list is at present far from complete, forms of the largest size and most striking appearance being still occasionally discovered. Forty years ago the number known was not more than one-third or one-fourth of what it is at present; and a crowd of novelties of the less conspicuous kinds is brought to light every year. Hence it is not too much to anticipate that 30,000 or even 40,000 forms may be acquired if entomologists continue to seek them with the enthusiasm and industry that have been manifested of late. On the other hand, the species of Rhopalocera seem to be peculiarly liable to dimorphic, to seasonal, and to local variation; so that it is possible that ultimately the number of true species—that is, forms that do not breed together actually or by means of intermediates, morphological or chronological—may have to be considerably reduced."

In the matter of classification of the Heterocera, Dr. Sharp's review of the later systems are very lucidly concise. He remarks:—

"Several attempts have recently been made to form a rough forecast of the future classification of moths. Professor Comstock, struck by some peculiarities presented by the Hepialidæ, Micropterygidæ (and Eriocephalidæ), recently proposed to separate them from all other Lepidoptera as a sub-order Jugatæ. Comstock's discrimination in making this separation met with general approval. The character on which the group Jugatæ is based is, however, comparatively trivial, and its possession is not sufficient, as pointed out by Packard, to justify the close association of Hepialidæ and Micropterygidæ, which, in certain important respects, are the most dissimilar of moths. The characters possessed by the two families in common may be summarised by saying that the wings and wing-bearing segments remain in a low stage of development. In nearly all other characters the two families are widely different. Packard has therefore, while accepting Comstock's separation of the families in question, proposed a different combination. He considers that Eriocephalidæ should be separated from all others as 'Protolepidoptera' or 'Lepidoptera Laciniata,' while the whole of the other Lepidoptera, comprised under the term 'Lepidoptera Haustellata,' are divided into Palæolepidoptera (consisting only of Micropterygidæ) and Neolepidoptera, comprising all Lepidoptera (inclusive of Hepialidæ) except the Eriocephalidæ and Micropterygidæ. The question is rendered more difficult by the very close relations that exist between Micropterygidæ and a sub-order, Trichoptera, of Neuroptera. Dr. Chapman, by a sketch of the classification of pupæ, and Dyer, by one on larval stages, have made contributions to the subject; but the knowledge of early stages and metamorphosis is so very imperfect, that the last two memoirs can be considered only as preliminary sketches; as indeed seem to have been the wishes of the authors themselves.

"Simultaneously with the works above alluded to, Mr. Meyrick has given a new classification of the order. We allude in other pages to various points in Mr. Meyrick's classification, which is made to appear more revolutionary than it really is, in consequence of the radical changes in nomenclature combined with it.

"As regards the various aggregates of families that are widely known in literature by the names Bombyces, Sphinges, Noctuæ, Geometres, Pyrales, we need only remark that they are still regarded as to some extent natural. Their various limits being the subject of discussion and at present undecided, the groups are made to appear more uncertain than is really the case. The group that has to suffer the greatest change is the old Bombyces. This series comprises the great majority of those moths that have diurnal habits. In it there were also included several groups of moths the larvæ of which feed in trunks of trees or in the stems of plants, such as Cossidæ, that will doubtless prove to have but little connection with the forms with which they were formerly associated. These groups with aberrant habits are those that give rise to the greatest difficulties of the taxonomist."

Then follows a consideration in detail of the families, forty-seven in number, commencing with Castaniidæ, and concluding with Micropterygidæ. The arrangement is founded on that of Sir George Hampson in 'Moths of British India.'

The Diptera are divided into five series, and the Aphaniptera are appended as a sub-order. Of Hemiptera Dr. Sharp says that it is probable that about 18,000 species have been described, and that two-thirds of these belong to the Heteroptera. The classification of this order is a modification of that of Schiödte.

As a treatise of the natural history of insects the work will most certainly command a leading position. A great charm about it is, that although a distinctly scientific book, the matters upon which it treats are discussed in a bright and most interesting style, so that it appeals to "the man in the street," as well as to the student and the specialist. The illustrations are numerous and excellent.

New Zealand Moths and Butterflies (Macro-Lepidoptera). By G. V. Hudson, F.E.S. 4to, pp. i–xix, 1–144. Thirteen coloured plates. London: West, Newman & Co. 1898.

The particular object of the volume under present notice is to facilitate the work af those who may desire to study the lepidopterous fauna of New Zealand, and we think that it is eminently suitable for that purpose. Collectors who wish to identify and name the moths and butterflies that they capture or rear, will no doubt be easily able to do so with the aid of the well-executed figures, in conjunction with the descriptions. The figures, it may be stated, were drawn by the author himself from the specimens, and their chromo reproduction leaves little to be desired, except that one could have consulted the plates more conveniently if the numbering of the figures had been consecutive.

So far as concerns the arrangement of the work our author seems to have adopted the system of Meyrick. Whether or no he has been well advised in this matter is perhaps of no especial importance, seeing that there are about as many new systems of classification of the Lepidoptera as there are old ones still in use. At any rate Mr. Hudson has done a most useful service to the science of entomology in bringing together in a compact and convenient form the "Macro-Lepidoptera" of the area in question.

The lepidopterous fauna of New Zealand, as it is known to-day, does not appear to be an extensive one. Altogether, two hundred and forty-three species are referred to by Mr. Hudson, and these are distributed among the families as under:—

Caradrinina, 81.
Notodontina, 136.
Papilionina, 15.
Psychina, 2.
Micropterygina (part), 9.

The Lasiocampina are not represented, and the Pyralidina, Tortricina, and Tineina are not dealt with.

Analyzing the list still further, we find that of Arctiadæ there are three species, one of which is the migrant *Utethesia* (*Deiopeia*) *pulchella;* of Caradrinidæ sixty-eight species are enumerated, and among these are two other migrants, *i. e. Agrotis ypsilon* (*suffusa*) and *Heliothis armigera.* Plusiadæ show five species, including *Plusia eriosoma*, Doubl., which is here treated as identical with *Plusia chalcites*, Esp., a South European species. Hydriomenidæ (95 species), Sterrhidæ (1 species), Monocteniadæ (4 species), Orthostixidæ (2 species), and Selidosemidæ (26 species), comprise the geometrid section of Notodontina, whilst the Sphingidæ is only represented by the vagrant *Sphinx convolvuli*, L. (= *Protoparce distans*, Butl.). In Papilionina there are six species of Nymphalidæ, including two migratory insects, *Anosia erippus*, Cr. (= *plexippus*, L.), and *Vanessa cardui* (= *kershawii*, McCoy); the Satyridæ have four members, and the Lycænidæ muster five. There are two species of Psychina and nine of Hepialidæ, which family is placed in Micropterygina.

The species described as new to science, seventeen in number, are as follows:—

Caradrinidæ: *Ichneutica dione*, *Melanchra maya*, *M. merope*, *M. omicron*, *M. alcyone*, *M. asterope*, *M. octans*, *M. cœleno*, and *Agrotis innominata.*

It may be stated that *Melanchra*, Hübn., as employed by Meyrick, embraces all the species usually referred to *Mamestra.* It would appear to be well represented in New Zealand, as upwards of thirty species are placed in the genus.

Hydriomenidæ: *Chloroclystis antarctica*, *C. maculata*, *C. rectilineata*, *Xanthorhoe adonis*, and *Notoreas simplex.* As no less than thirty-one species are referred to *Xanthorhoe*, this would also seem to be a strong genus in New Zealand.

Selidosemidæ: The new species are *Selidosema humillima*, *Declana hermione*, and *D. griseata.*

One leaves the perusal of this book with the impression that there probably is still much lepidopterous material in New Zealand, belonging even to the groups discussed, awaiting the enterprising collector. Mr. Hudson suggests that he may, at some future time, publish a companion volume on the Micro-Lepidoptera of the country. We hope that the present volume will secure the liberal support that it merits, and so help to encourage the author to proceed with the contemplated second volume.

A Catalogue of the Lepidoptera of Northumberland, Durham, and Newcastle-upon-Tyne. By John Robson, F.E.S. Pt. I. 8vo, pp. i–iv, 1–195. London: Williams and Norgate. May, 1899.

In the first part of this exceedingly useful Catalogue the Papilionina, Sphingina, Bombycina, and Noctuina are dealt with. It is something more than a mere list of the species of Lepidoptera occurring in the area referred to, as there are notes, sometimes very copious, to each species. Perhaps the more frequent mention of dates might have invested the annotations with additional value.

The classification and nomenclature is that adopted by Barrett in 'Lepidoptera of the British Islands'; but with a view of making the Catalogue practical to those who follow other authorities, references are given to Stainton's 'Manual,' to Newman's 'British Moths,' and to Meyrick's 'Handbook of British Lepidoptera.' So far as the Noctuina are concerned, it would seem that about two-thirds of the whole number of British species are found, or have been recorded as occurring, in the counties named.

We subjoin a few extracts from the Catalogue because they are generally interesting, and they will also serve as examples of the thorough manner in which Mr. Robson has treated his subject:—

Erebia blandina.—"This interesting species, which had previously only been taken in Scotland, was first recorded as an English insect by Mr. Backhouse, who found it abundantly in Castle Eden Dene. It is still abundant there, and occurs in all open grassy places down almost to the sea level at the mouth of the Dene. Its range extends westward as far as the Dene runs, and I have found it plentiful on the banks of the railway between Thornley and Wellfield stations, and in Edderacres Wood adjoining. The wood extends to the turnpike and beyond, but I never found *blandina* on the west side of the road. This has often struck me as being singular, and also that the butterfly does not occur in any portion of Hesleden Dene, which approaches in one part to within a mile of Castle Eden Dene. It certainly is not because of some peculiar food-plant, for I reared the larva on almost any grass which was easily obtained." (P. 26).

Eurois satura [Hadena porphyrea].—"One of the rarest of the British Noctuæ, not a dozen authentic specimens being known. Mr. Meyrick suggests that it is only an occasional immigrant. It is named in the Twizell list, but it is more than probable that these were but well-marked forms of the next species. In the 'Entomologist' (vol. x. p. 99) is the following:—'A single specimen in my collection was taken by Mr. John Hancock, while it was at rest on the fencing of

Brandling Place, Newcastle-on-Tyne, in the month of April, 1845. August is stated to be the usual time of appearance of this moth. This exceptional instance has, I believe, never been recorded.—V. R. Perkins, Wootton-under-Edge; January, 1877.' Mr. Barrett (vol. iv. p. 114) speaks of this as 'a supposed capture at Newcastle-upon-Tyne,' and suggests that this also was a variety of *adusta*. Mr. Perkins, however, was a good observer, and not likely to make any record where there was room for doubt. As for the date of capture, Mr. Barrett himself gives June, July, and August for this species, and June, July, and, in forward seasons, the end of May for *adusta*. But all these species are very uncertain, and after an open winter might occur in April. As an illustration I might refer to the dates of Mr. Gardner's captures of *occulta* [June, July, August, September, and October]. Since the above was in type Mr. Perkins has written me to say that he still has the specimen, and that neither he nor the late Mr. Hancock had any doubt but it was correctly named." (P. 124.)

TAPINOSTOLA ELYMI.—"This insect was introduced to the British fauna in 1861, specimens having been taken on the Norfolk coast by the late Mr. Crotch. It was soon turned up on the Yorkshire coast, and I always understood that Mr. Eales was the first to take it in Durham, but Mr. Hedworth says 'Mr. Thomas Richardson, of Mount Pleasant, was the first to discover this species in its present habitat, South Shields.' It was then found at Hartlepool, Dr. Lees being, I believe, the first to take it. Mr. Gardner subsequently found the larva and pupa, and bred the insect. The food-plant, *Elymus arenarius* (sand reed or lyme grass), occurs in patches on the coast, and *elymi* should be looked for wherever it grows. It flies in early dusk, and is very easily distinguished on the wing. Later on it settles on the stems of the food-plant, from which it may be easily boxed. The most productive patches of the plant near Hartlepool are now destroyed, but the larvæ, living inside the stem, are not injured by deposits of smoke, &c., on the leaves." (P. 157.)

CIRRHŒDIA XERAMPELINA.—"A rare species but widely distributed, and will probably be found more plentifully when we know more of its habits. The imago is generally found at rest on the trunk of an ash tree, and the late Mr. T. Meldrum, of Ripon, who was particularly successful in taking it, was of opinion that after emerging from pupa it sat on the trunk till evening, but did not return there after the first flight. Mr. Finlay found imagines on ash trunks in Meldon Park at the end of August and in September, but never commonly." Then follow other localities. (P. 177.)

The work is issued as vol. xii. Part I. of the 'Natural History Transactions of Northumberland, Durham, and Newcastle-upon-Tyne,' and great credit is due to all concerned in its production. We hope that the second part of Mr. Robson's Catalogue will be published at an early date.

NOTES AND OBSERVATIONS.

Emydia cribrum *not* taken in the New Forest by Mr. F. Bond.—When writing his note (*ante*, p. 209), Mr. Sydney Webb apparently forgot my very definite statement (*ante*, p. 102) that the *exact* spot where the late Mr. F. Bond used to capture *Emydia cribrum* is well known to me, and is *not* within the limits of the New Forest, but about four miles from the western edge of it. The published description of this spot in the 'Manual,' where the words "and in the New Forest" refer to it alone, is therefore inaccurate, and consequently "rather misleading"; and the same is true in a less degree of Mr. Bond's MS. description of it, as quoted by Mr. Webb, because he says "Near Ringwood, in the New Forest . . . . ," whereas *neither* Ringwood *nor* the spot where he used to take *cribrum* is in the New Forest, and his idea of the extent of the Forest was clearly a little at fault. The place alluded to by Mr. Bond as "St. Lawrence" is generally known as "St. Leonards."—Eustace R. Bankes; The Close, Salisbury, August 8th, 1899.

Dianthœcia cucubali in July.—Referring to the record of *D. cucubali* taken at sugar on July 24th of the present year (*ante*, p. 213), I see no reason why it should not be a late emergence of the first brood, for I have only to-day had a specimen of the closely-allied *D. carpophaga* emerge in my breeding-cage, and six or seven more within the last fortnight; as well as two *D. capsincola*. All these were bred from seed-heads of *Silene inflata* and *Lychnis* collected last autumn. Under ordinary circumstances *D. carpophaga*, *D. cucubali*, and *D. capsincola* are generally to be taken as soon as *Silene inflata* is in flower, about the end of May or beginning of June; but it is evident from my experience this year that *carpophaga* and *capsincola* sometimes emerge later. There is nothing exceptional in the situation of my breeding-cage, which is under a hedge fronting north, but gets plenty of sun in the afternoon.—J. Gardner; 6, Friar Terrace, Hartlepool, August 4th, 1899.

Dianthœcia cucubali in July and August.—It may be of interest to know that I have taken two *D. cucubali* lately in the house in this road: one on July 25th, and one this morning; the prior one was perfect, but the latter was nipped in the bedroom window. This seems to bear out the fact, stated in your Journal, that the species is double-brooded.—E. Sparke; 1, Christchurch Villas, Tooting Bec Road, S.W., August 12th, 1899.

Chrysophanus (Polyommatus) phlœas.—The number of *P. phlœas* which have already put in their appearance during the last few days of this month, suggests another copper season, such as was experienced in 1893. On the afternoon of the 28th I paid a visit to a very limited part of the Sussex Downs, an area of only a few hundred yards in length and about one hundred in width, where I found butterflies very plentiful both as regards numbers and species. On so small a space of ground I noted fourteen species, including *Argynnis aglaia* in plenty, and *Pyrameis cardui*. *P. phlœas* was abundant, but unfortunately the one variety which I captured was the only specimen I found to be in bad condition, it having by some injury lost almost the whole of the right secondary, otherwise it would have been a good insect, being without the usual copper band on the secondaries; two such varieties I took in 1893. I might add that *Pyrameis atalanta* appears unusually abundant already this season; besides the perfect insects, which are now daily emerging, I have found larvæ in various stages on almost every patch of nettles examined.—F. W. Frohawk; July 31st, 1899.

American Notes.—In the 'Scientific American' (1899, lxxx., pp. 75–6), Prof. L. O. Howard records an Ephydrid (*Psilopa petroles*, Coquillet) as breeding in large numbers in crude petroleum pools in California.

The Diptera certainly do not intend to be left behind in the struggle for existence, as there is scarcely any situation in which they cannot exist. It is well known that their larvæ are not uncommonly found in urine under certain conditions, as also in various parts of the human frame or in that of other animals. I myself have also found the larvæ of *Helophilus* (?) in the sea near Deal, and kept them alive for three days in sea-water.

In the 'Proceedings of the Entomological Society of Washington' (1899, iv., pp. 265–91), Mr. C. L. Marlatt's presidential address will be probably interesting to British entomologists. It is entitled "An Investigation of applied Entomology in the Old World."—G. W. K.

CAPTURES AND FIELD REPORTS.

Colias edusa in Wiltshire.—On Aug. 14th I saw a male specimen of *C. edusa* in the Stonehenge district.—John Henry Leech.

Colias edusa in Co. Waterford.—On the 10th of this month I saw four specimens of this butterfly, and succeeded in capturing one, a male. On the following day I saw another. The clouded yellow is decidedly rare about here in most seasons, and many years pass without my being able to see a single specimen.—William W. Flemyng; Coolfine, Portlaw, Co. Waterford, Aug. 15th, 1899.

Colias edusa in Co. Cork.—On Aug. 1st a specimen of *C. edusa* is reported in the 'Field' as having been seen at Glengarriff Harbour, and another at Skibbereen, on Aug. 10th last.—F. W. F.

Deilephila livornica in Surrey.—Mr. W. C. Patterson records in the 'Field' of Aug. 19th, the capture of a specimen of this rare moth at Limpsfield, during the previous week; it came to light.—F. W. F.

Vanessa atalanta in London.—On Aug. 13th last I was very pleased to notice a beautiful specimen of *V. atalanta* sitting on a white dahlia-flower, in a garden on the Victoria Embankment, near the Temple Station. I may mention that I have seen odd examples from time to time during the month, both at Balham and in Chelsea.—Richard South; 96, Drakefield Road, Upper Tooting, S.W.

Argynnis latona in Hampshire.—Miss Ethel Urquhart sends the following cutting from 'The Times,' Aug. 17th last:—

"*A Rare Butterfly.*—Mr. William Dale writes from the Hampshire Field Club, Southampton:—'It will interest many of your readers to hear that there was captured in this country on Friday last a specimen of that very rare butterfly, *Argynnis lathonia*, the Queen of Spain fritillary. It was caught by my son on the higher part of the sandy beach at Highcliffe, in Christchurch Bay, at the entrance of the chine. It was in perfect condition, but as it is hardly reckoned a British species the supposition is it came from France, favoured by the exceptionally fine weather and southerly winds.'"

LIMENITIS SIBYLLA IN ESSEX.—On July 21st last, I caught a specimen of *L. sibylla* in Hazeley Hall Wood, where I have collected constantly for the last twenty-five years without previously seeing this butterfly.—E. A. FITCH; Maldon.

EREBIA ÆTHIOPS (BLANDINA) IN THE ISLE OF SKYE.—This butterfly was not uncommon, on the first day of August, on some grassy cliffs on both sides of the Leath Allt, a stream running into the sea on the east coast of Skye, between Staffin and Portrigh (Portree). The specimen that I secured for examination was not at all wild, and was easily caught. I also captured and released, after examination, *Cœnonympha pamphilus*, *Polyommatus icarus*, and *Pieris rapæ*. I also saw, but did not take, a species of *Epinephele*, probably *ianira*. In the Pass of Brander, near Loch Awe, on the mainland, I noticed *Pyrameis* (*Vanessa*) *atalanta*.—G. W. KIRKALDY; Wimbledon.

CHRYSOPHANUS (POLYOMMATUS) PHLŒAS VAR. SCHMIDTII.—Mr. Robson mentions in his 'Catalogue of the Lepidoptera of Northumberland, Durham, and Newcastle-upon-Tyne' that Miss Annie Rossie captured two examples of this variety of *C. phlœas* "a little to the north of Newcastle-upon-Tyne in the summer of 1895."

CYANIRIS ARGIOLUS, L., IN LONDON.—On July 29th last I captured three specimens, one male and two females, of this butterfly in the garden here, and saw a fourth. They were flying in the bright sunshine, between two and five o'clock in the afternoon, and were attracted by the privet flowers. They are in good condition, and had doubtless bred in the immediate neighbourhood, probably in this garden, as there are holly-trees and ivy which flowers. I think this occurrence is particularly interesting, as we are within three miles and a-half of Charing Cross; and may add that during a number of years that my father and myself have noticed the butterflies here, we have neither seen nor heard of this species occurring in the neighbourhood.—HAMILTON H. DRUCE; The Beeches, Circus Road, London, N.W.

MACROGLOSSA STELLATARUM ABUNDANT.—*M. stellatarum* is nearly as abundant here as at Brighton (*ante*, p. 211), but always singly. I have not yet noticed this species in pairs here. A jasmine plant growing up the side of the house seems to be especially favoured.—ALAN W. CARDINALL; The Cliffe, Limpley-Stoke, near Bath.

This species seems to swarm here; another batch appears to have just arrived.—E. A. FITCH; Maldon, Aug. 20th, 1899.

SPILOSOMA LUBRICIPEDA IN AUGUST.—On Aug. 8th last I noticed a male specimen of *S. lubricipeda* on the garden fence here, and on the 12th of the month a male example of the same species emerged in an outdoor breeding-cage, in which I had reared a brood of larvæ derived from ova deposited by a female early last June. The last individual of this brood pupated only about a fortnight ago. Yesterday a specimen of the var. *zatima* emerged in the same cage as that last referred to.—RICHARD SOUTH; 96, Drakefield Road, Upper Tooting, S.W., Aug. 21st, 1899.

COSMIA PYRALINA NEAR MALDON.—I had the pleasure of taking a very fine example of this rare and local species at sugar on a balsam-poplar in my garden here, on July 14th last. Continuous sugaring ever since has not produced another specimen. In 1885 I beat a larva of this species from elm near Brentwood, the imago resulting from which, on July 10th of the same year, I still possess. I fancy there are very few bred *C. pyralina* in existence. The only other time and place I have found this species, during my thirty years' collecting, was at Monk's Wood, Hunts, where, in the early part of August, 1875, my friend Mr. Nelson M. Richardson and myself took twelve or fifteen specimens at sugar. As they were not in the finest condition, I conclude that the species generally emerges about the middle of July.—(Rev.) GILBERT H. RAYNOR; Hazeleigh Rectory, Maldon, Essex, Aug. 16th, 1899.

AGROTIS ASHWORTHII, ACIDALIA CONTIGUARIA, &C., IN NORTH WALES.—During the third week in July I took a few nice *Acidalia contiguaria* near Penmaenmawr, and have now larvæ feeding from eggs deposited. Within five or six inches, too, of a couple of *contiguaria*, I found a small batch of eggs of *Agrotis ashworthii*, from which the larvæ have also hatched out, and appear to be doing well. No other species of rarity were observed. *Agrotis lucernea* was not uncommon, flying wildly about stone-heaps on the mountain sides, but, from the nature of the ground, very difficult to catch. Dark *Melanippe galiata* and *Gnophos obscurata* were common, with *Larentia cæsiata, Cidaria populata, Pseudoterpna cytisaria*, &c. *Acidalia promutata* occurred on the lower rocks.—GEO. T. PORRITT; Crosland Hall, Huddersfield, Aug. 4th, 1899.

ACRONYCTA MEGACEPHALA LARVÆ ABUNDANT.—During the past four weeks I have seen one or more larvæ of *A. megacephala*, almost each day, on the trunks of poplar-trees here and there in the vicinity of King's Road, Chelsea. On Aug. 2nd, however, I was surprised to notice that almost every poplar that I passed, in walking from Battersea Bridge to Fulham Road, had two or three of these larvæ resting on the trunk; in one case I counted ten between the base of the lowest branch and the root of one tree. I should also mention that larvæ of *A. aceris* are more than usually common this year in the same district. — RICHARD SOUTH; 96, Drakefield Road, Upper Tooting, S.W., Aug. 15th, 1899.

EUCOSMIA UNDULATA AND DIPTERYGIA SCABRIUSCULA (PINASTRI) IN LONDON.—I was surprised to net a specimen of *E. undulata* in my garden last July; also to take, at sugar, *Dipterygia scabriuscula* amongst the common London insects.—J. A. FINZI; 53, Hamilton Terrace, N.W.

AMPHIDASYS BETULARIA VAR. DOUBLEDAYARIA IN THE LONDON DISTRICT.—I took a specimen of *A. betularia* var. *doubledayaria* in a garden at Dulwich on June 17th last. Unfortunately it had been trodden upon, but the thorax and the wings on the left side were intact.—A. R. KIDNER; 139, Rosendale Road, West Dulwich, S.E.

STAUROPUS FAGI AT WATFORD AND EALING.—On July 6th a fine fresh male specimen of this species flew into my dressing-room, attracted by the incandescent gas-light. The following night another came to the window, which happened to be shut, and before I could open it the insect flew off; but I had a good view of it before it went. I am not aware that this moth has been taken in this district previously. My friend Mr. Laurence Miles, of Ealing, had one brought to him by a policeman, who took it off one of the electric (arc) lamps there. Not knowing that the insect was a rare one, he took no note of the date.—ARTHUR COTTAM; Eldercroft, Watford, Aug. 7th, 1899.

PLUSIA MONETA IN SURREY.—*P. moneta* seems to have established itself satisfactorily in this neighbourhood. In the early nineties a fair number were taken at sugar by an entomologist who mistook them at the time for *P. festucæ*, and only identified them as *P. moneta* last year. In May this year I was fortunate enough to secure four larvæ on the solitary plant of *Aconitum* which my garden possesses. These hatched out successfully in July, and a few days afterwards a fifth insect was taken at a lamp indoors. —G. OGLE; St. John's, Woking.

PLUSIA MONETA AT CAMBRIDGE.—I obtained a fair example of *P. moneta* in the New Court of St. John's College, Cambridge, on July 17th last. The specimen had been caught in a web, but fortunately was still in almost perfect condition.—A. R. KIDNER; 139, Rosendale Road, West Dulwich, S.E.

PLUSIA MONETA IN WILTSHIRE.—In the August number of the 'Entomologist' this species is reported from North Wilts. Two years ago, on July 7th, 1897, a fine specimen of this moth was taken in our garden here, by my mother. We were not sure of the insect at first, but have now clearly identified it as *P. moneta*. I have not seen any other records from Wiltshire.—CECIL M. GUMMER; 2, Swayne's Close, Salisbury.

NOTE ON MECOSTETHUS GROSSUS.—With reference to Mr. Lucas's paper (*ante*, p. 179), *Mecostethus grossus* is at the present date (July 31st) fairly abundant in the New Forest bogs.—HERBERT ASHBY; Pinehurst, Basset, Southampton.

ZYGÆNA FILIPENDULÆ VAR. CHRYSANTHEMI.—An example of *chrysanthemi*, the variety of *Z. filipendulæ* in which the crimson colour of spots and hind wings is replaced by fuliginous or brownish black, was captured on the hills at Fairlight, near Hastings, by Mr. S. Peters, on July 9th, 1898. —H. W. PETERS; 32, Pevensey Road, Eastbourne.

COLLECTING IN GLOUCESTERSHIRE.—I spent part of last month, from the 3rd to the 22nd inclusive, in the secluded village of Utey, on the Cotswolds, where I had the assistance and frequent company of a resident entomologist, Mr. R. W. P. Fitzgerald. Sugaring was fairly good, though no great rarities occurred, the best "take" being several lovely specimens of *Acronycta ligustri*.—(Rev.) CHAS. F. THORNEWILL; Calverhall Vicarage, Whitchurch, Salop, Aug. 4th, 1899.

SESIA ICHNEUMONIFORMIS IN GLOUCESTERSHIRE.—On July last 21st I captured a specimen of *S. ichneumoniformis* in an old quarry at the north end of the "Bury Hill."—(Rev.) CHAS. F. THORNEWILL; Calverhall Vicarage, Whitchurch, Salop.

HYPSIPETES SORDIDATA (= ELUTATA).—Some of the specimens referred to by Mr. Arkle as *H. elutata* (*ante*, p. 219) have been sent to us for examination, and we have no hesitation in saying that they are examples of *H. impluviata*.

Pachytylus migratorius in Hampshire.—On Aug. 1st I took a specimen of *P. migratorius* near Brockenhurst in the New Forest. It was on the wing at the time.—H. W. Simmonds; Sussex View, Cumberland Gardens, Tunbridge Wells, Aug. 17th, 1899.

Incidental Collecting in the Lake District.—I went for a fortnight's excursion to the Lake District a short time ago—May 27th to June 10th; but I so far determined not to give much time to collecting that I did not take a net with me. However, I boxed a few things which just happened to come in our way as we walked along. On Muncaster Fell I boxed two of *Thecla rubi* flying over the top of the fell, where dozens could easily have been caught in a short time. We (three of us) could not find any at rest on the stems of the grass, &c., as the sun was setting, like their allies the "blues"; nor could we find them on the rocks or anywhere else. On Burmoor I saw a larva of *Nemeophila plantaginis*, and another on the top of Sty Head Pass; a specimen of *Hadena thalassina* flew to light in my sitting-room at Bowness. In Coleoptera, my nephew called my attention to a beetle, as we were going along Burmoor, near the foot of Scaw Fell, which proved to be *Carabus glabratus*, and the only one we met with. Near there were also a few of *Corymbites cupreus*. At the foot of Kirk Fell I found a good specimen of *Meloë proscaræbeus* crawling into its hole in the mountain; and close by I dug out one of *Geotrupes vernalis*. I saw three more, going up Sty Head Pass. *C. cupreus* were very plentiful up this pass, taking short flights in the hot sunshine; there were also a few in Borrowdale and on Helvellyn, very numerous in Grisedale Pass, and some on the top of Kirkstone Pass. The great majority of them were brownish violet in colour. Amongst the hundreds I saw in the district I only noticed four females. On the top of Sty Head Pass *C. arvensis* were plentiful, running over the rocks and wet turf, apparently making much of the few sunny days they get there in a year. On the same spot were also *Byrrhus fasciatus*, *Pterostichus vitreus*, and *Cychrus rostratus*. On Helvellyn were *Nebria brevicollis*, *C. catenulatus* (the latter eating a worm), and a few more of *C. arvensis*. On the top of the mountain I took a red-legged var. of *N. gyllenhali;* and in the shelter on the top I took *Megacronus analis*. In Kirkstone Pass were a few of *Necrophorus mortuorum* under a dead blackbird. *Diacanthus æneus* and *holosericeus* we saw on Orrest Head, Windermere. In Diptera, *Tipula vernalis* and *Bibio lacteipennis* were plentiful on the top of Helvellyn and on the top of Sty Head Pass. In Neuroptera, *Drepanepteryx phalænoides* and *Baetis venosa* I took at Windermere. In a stream there I saw several larvæ about three-quarters of an inch long, very similar to the larvæ of caddis-flies, but, instead of making a case they could take about with them, they generally sheltered themselves under stones; but one made use of some bits of stick and grass-stems that had been washed together. They came out of their shelter by a jerky movement, little by little, first to the right, then to the left, very cautiously, every now and then drawing back into their retreats, but sometimes nearly the full length of them would be out. I could not perceive them to seize anything, either in the way of food or material for case-making. Are there some of the Trichoptera larvæ which have not movable cases?—F. Milton; 7, Chilton Street, Bethnal Green, E., Aug. 4th, 1899.

Collecting on Dartmoor.—While staying at Dartmoor, in the earlier part of last June, my sister and I took, among others, the following Lepidoptera. I was only there for four clear days, and did not do much night-work, but from the insects we took I should think the district would yield very good results if properly worked:—

Rhopalocera: *Euchloë cardamines*, *Leucophasia sinapis*, *Argynnis euphrosyne* (one), *A. selene*, *Vanessa atalanta*, *V. io* and *V. cardui* (hybernated), *Pararge egeria*, *P. megæra*, *Melitæa artemis* (two somewhat worn specimens), *Thecla rubi* and larva of *T. quercus*, *Lycæna argiolus*, *L. alexis*, *Syrichthus malvæ* and variety with confluent spots, *Nisoniades tages*, *Hesperia sylvanus*.

Heterocera: *Smerinthus ocellatus*, *Sphinx ligustri*, *Chærocampa elpenor* (one), and *C. porcellus* (two), *Macroglossa stellatarum*, *Lithosia rubricollis* (one, just emerged from the pupa), *Euthemonia russula*, *Chelonia villica*, *Arctia fuliginosa*, *A. mendica*, *A. menthastri*, *Agrotis exclamationis*, *Mamestra brassicæ*, *Hecatera serena*, *Anarta myrtilli*, *Heliodes arbuti*, *Euclidia glyphica*, *Phytometra ænea*, *Venilia maculata*, *Odontopera bidentata*, *Fidonia atomaria*, *Melanippe montanata*, *Chesias rufata* (very abundant)). *Leucophasia sinapis*, though nowhere common, seemed to be pretty widely distributed about the neighbourhood, as we took single specimens in most of the woods we visited. One I found flying with a male *Euchloë cardamines*, the female of which it greatly resembles when on the wing. *Chærocampa elpenor* and *C. porcellus* we took at rhododendrons at dusk. They seemed fairly common, but were hard to capture. *Argynnis selene* and *Thecla rubi* were extremely abundant in the woods, and also on the heaths and hill-sides.—Cecil M. Gummer; 2, Swayne's Close, Salisbury.

Notes from Bath.—The generally hot, dry season we have experienced has, as usual, been favourable to the production of the Diurni. A special instance of this came under my notice on Monday last, Bank Holiday. Taking a walk in the country near Weston-super-mare, I noticed by the roadsides, at the blossoms of wild mint, knapweed, and bramble, *Epinephele tithonus*, *Pararge megæra*, *Lycæna icarus*, *Vanessa atalanta*, *V. io*, *V. urticæ*, frequently, and one male example of *Gonepteryx rhamni*. On crossing a pasture-field with many patches of lucerne, a most lively scene was witnessed. The field, about two acres in extent, seemed, to use a common expression, alive with the small "whites" (*Pieris rapæ*), and flitting with them was *Lycæna icarus*, apparently quite as numerous; it was one constant movement. One female *Colias edusa* I noticed after watching some time. A thunderstorm approaching soon after, how changed the scene! in a few minutes not a single insect could be seen on the wing. I may add to these notes that I have frequently seen *Macroglossa stellatarum* in several parts of the country during the season.—J. B. Jefferys; Bath.

Lepidpterous Larvæ on Clematis.—On a fine plant of *C. vitalba* overshading a summer-house in the garden here were great numbers of larvæ of *Odontopera bidentata* and *Mamestra persicariæ* in September, 1898. This year, so far, there are no signs of a continued abundance. Surely this is a somewhat unusual food-plant for both species, especially *persicariæ*, which is considered an exclusively low feeder. This latter species occurred in two forms, *i. e.* dark chocolate-brown and and an olive, without any intermediate gradations. I bred some numbers of both species; *bidentata* turned out somewhat darker than usual (but probably not due to the food-plant), and *persicariæ* were all very large and clearly-marked specimens.—A. D. Imms; "Linthurst," Oxford Road, Moseley, Worcestershire, Aug. 14th.

[The larva of *M. persicariæ* has been recorded as feeding on clematis; also on ivy, lilac, raspberry, plum, and poplar. See Entom. xxiii. p. 319.—Ed.]

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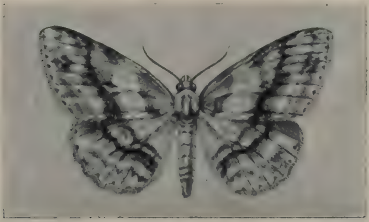
TEPHROSIA BIUNDULARIA, AB.



THE above illustration represents a very striking aberration of *Tephrosia biundularia*. Mr. William M. Christy, of Watergate, Emsworth, who obtained the specimen, has been good enough to lend the insect for figuring. He writes:—"It was taken in the moth-trap, which is placed in the woods here, sometime between the 1st and 23rd of June, 1891." As the figure gives an excellent idea of the markings of the specimen, it seems only necessary to add that the colour is pale ochreous brown, with a whitish antemedial band on the fore wings; the basal third of the hind wings is also whitish. The post-medial black line on both wings is unusually well defined, and is shaded with a darker tint of the ground-colour.

ROUND THE CHESTER ELECTRIC LAMPS.

By J. Arkle.

If the suburbs of a town, or indeed any part of one, are free from smoke and noisome vapours, and planted with trees and gardens and shrubberies, the entomologist will find moth-hunting by the electric lamps very profitable. On the other hand, if the conditions are unfavourable in the immediate neighbourhood, electric or other lamps do not appear to be worth working; there should be varied, or at any rate existing, vegetation, with the accompanying circumstance of fairly pure air. Let me quote the following illustrations in support of what, I am prepared to admit, may be a rule and not a law. A large electric lamp—high up and very conspicuous—at the Winter Gardens, Morecambe, only attracted, July, 1889, *Acidalia scutulata*, *Xylophasia polyodon*, *Triphæna pronuba*, and *Plusia gamma* (Entom. xxii. 296). The more interesting moths of Heysham Moss, three miles away, did not put in an appearance at all. I have no doubt the results would have been different had there been well-clothed sandhills about. Morecambe, in short, was deficient in the "greenery" conditions, although its air is of the freshest. Again, at Chester, we have now a varied vegetation almost luxuriant. The lime flourishes in our streets and suburbs, and on July 19th the air was laden with the scent of its pendent bunches of yellow blossoms. There are also the poplar, birch, beech, sycamore, and horse-chestnut, together with endless privet and hawthorn, and ornamental willows and sallows. I specially select these trees and shrubs since they account for all, or nearly all, the best moths we take at the electric lamps, and because many of them are either replaced by other species—a mile or so away, and then for a large area—or they are almost non-existent. Thus the lime is replaced by the oak; the birch, beech, and horse-chestnut practically cease; the hawthorn continues; but the sallow, willow, poplar, and privet become scarce. The conclusion, therefore, would seem to be this—the life-histories of the extraordinary species we have taken during the past two seasons (Entom. xxxi. 299) at the electric lights are confined to little more than the area actually illuminated by the lamps themselves. The best lamps are those where the vegetation referred to is most profuse. Again, there are species of moths recurring, year after year, only a mile away from the city, which, it would be pretty safe to say, are never attracted. I only know of one puzzling species, *Agrotis porphyrea*, which frequently occurred, fine and fresh, in June and July. I have searched in vain for any food-plant of the insect other than heath, and conclude that this apparent exception to the rule is due to my ignorance of all its pabulum. How species locate themselves in towns like Chester, where, in times gone by, there was neither the idea nor even the room for tree planting, but where, in modern times, tree-lined streets are looked upon as matters of course, seems, at first sight, a puzzle. But where the carcase is, we are told, there will the eagles be gathered together, and this observation lets in a lot of light upon the situation. Plant the trees, and, other things being equal, the insects will find them.

I now append, up to date, a list of the moths taken this season at our electric lamps. The best species the reader may choose for himself; but I think they will usually be found at the beginning of each monthly list:—

MAY.

Dicranura bifida.—From a commercial point of view, this moth appears to be twice the value of *D. furcula;* and yet it was a common moth up to the end of June, much more so than *D. furcula.* It does not seem to fly much when attracted. It either circles down to the ground about two or three feet from the lamp, or rests upon the adjacent walls, or, more frequently perhaps, high up on the lamp itself. A friend uses, with success, a simple but ingenious instrument fixed to the end of a long stick for bringing such moths off the lamps. Another stick, or pole, of equal length carries a good-sized net for capturing insects on the wing. But all this is hot and laborious work on a warm summer night, especially as most of the insects are of the commonest description, and cannot be determined when on the wing. There is, it is to be confessed, always a good deal of weeding out.

Smerinthus ocellatus.—To see, and *to hear*, this big, handsome fellow come flopping on the ground from the lamp above is almost startling. I use the word "fellow," for it is a drawback that nearly all the moths that come to the lamps are males. I do not think the proportion of females, mix the species as you like, exceeds five per cent. *S. ocellatus* was very common to the end of June.

Amphidasys betularia.—This species appeared about the end of May, and continued to the end of June as an almost abundant insect. Most were of the black variety (*doubledayaria*); but the type also appeared in proportion to the black form of from one in eight to one in twenty, according to various collectors. I heard of no types last season. What, then, has come over the species here to produce them in this! To my mind it is simply inexplicable; and the best way out of the difficulty, I believe, is to accept the broad fact that, throughout the animal world, including man, there is a tendency to vary, in coloration, from light to dark forms, and that there are some uncommonly good-looking people in all. Such explanatory phrases as "local environment" fail at Chester, just as they do at other places that could be mentioned. Not only did *A. betularia* occur as extreme forms this season, bnt a good number of intermediates were taken as well. A few of these are exactly half-way in coloration between the type and var. *doubledayaria;* but the chief colour disturbance is a substitution of white, in the latter, in the costal region of the lower wings. In a few specimens the white basal spot of the upper wings is absent. One of the best intermediate forms I have seen, if not the best, of *A. betularia*, has the following history:—A friend was just about to cover it with his net, as it rested on the ground, when one of the madding crowd picked it up with his finger and thumb and politely presented it, leaving, of course, his monogram upon the insect. Like the preceding species, *A. betularia* seems to be electrified by the lights, wheeling round in small circles, and finally resting upon the ground, where, unlike the others, it usually rests for an indefinite period. Cats are the greatest enemies to moths when on the ground, for they watch for them through all the hours of the night, and devour them greedily. I have often seen as many as three round a lamp, and they were very unwilling to be driven away.

Other moths in May were *D. vinula, Spilosoma lubricipeda, S. menthastri* (sad nuisances, as they occurred in such numbers), *Habrostola triplasia, Hadena oleracea* (another nuisance), *Caradrina blanda, Selenia lunaria, Odontopera bidentata, Melanippe fluctuata, Pionea forficalis*, &c.

JUNE.

Acronycta alni.—This moth turned up on the 6th, and occurred commonly until about the 20th. During the night of the 17th I was with a collector who took three. Some of the forms have the upper wings exceptionally dark, almost black, the lower ones appearing in beautiful white contrast, and often margined with a black, suffused border.

A. psi, A. megacephala, A. rumicis.—Common during the first three weeks; *A. tridens* (?), possibly, and during the same period; but I put a query to it as I am unable to distinguish between this species and *A. psi.* A writer says *A. tridens* has less than six dashes on the costa; and *A. psi* more than six. What the insect would be with six dashes, neither less or more, is not stated. But the "dashes" are so indistinct that I am unable to determine their number on any given specimen; in short, I am about as foggy upon the differentiation of the two species as was the hero in Burns' 'Death and Dr. Hornbook' on the crescent moon:—

> "To count her horns wi' a' my power I set mysel',
> But whether she had three or four I couldna tell."

A. leporina.—A few specimens were taken.

Smerinthus tiliæ.—The honours of the season fell to a visitor, Mr. Quinton, who captured a specimen of this addition to the district list, at the end of June.

S. ocellatus.—Common during the first three weeks of the month. On the night of the 5th no less than five were on the ground at the same time, and within five or six paces of the same lamp. Three of them were captured, and the remaining two escaped.

S. populi.—I did not observe this species until the 14th. It was often flying round the same lamp in company with *S. ocellatus.* This fact, together with the non-union of two species so like each other in size and general appearance, is, I think, very significant. The same observation applies to other species; for example, *A. badiata* and *A. derivata.*

Chœrocampa elpenor.—One taken, June 7th.

Notodonta dictæa.—Fairly common, but they had to be worked for. A collector might, up to the middle of the month, have taken, on an average, one or two per night. Netting would begin, in these long days, at 11.15 p.m. The round of lamps would be worked, and then the return made for moths at rest. This would take up to 2 a.m. or 2.30 next morning, when the great luminary would rise in the east, and the electric lamps would blanch and grow pale before it.

N. dictæoides.—A few, I am told, but very few, were captured.

N. ziczac.—Fairly common.

Dasychira pudibunda.—A few were taken.

D. bifida.—This good and handsome moth was a common visitor.

D. vinula.—Very common.

D. furcula.—Occasional.

Habrostola triplasia.—A fine-looking, dark moth, and fairly plentiful. There was a handsome form with the basal outward-bent line, and the outer-marginal inward-bent line, almost scarlet.

Other common moths.—*Phalera bucephala, Euchelia jacobææ, Grammesia trilinea* (looking in the electric light as if dressed in buff and gold), *Plusia iota, P. pulchrina, P. chrysitis, Xylophasia hepatica, X. rurea* with var. *combustata*), *X. polyodon* (with the dark form), *Hadena thalassina, Cucullia umbratica, Dianthœcia cucubali* (the larvæ have since been abundant in the seed-vessels of white campion), *Axylia putris, Leucania impura, L. pallens, Chortodes arcuosa, Apamea basilinea, Mamestra brassicæ, Miana strigilis* (with var. *æthiops*), *M. fasciuncula, Caradrina cubicularis, C. blanda, A. betularia, O. bidentata, Cabera pusaria, S. lunaria, Panagra petraria* (one only, worn), *Abraxas grossulariata, Anaitis plagiata* (one), *Pionea forficalis, Botys urticalis, Aglossa farinalis, Hydrocampa nymphæata, H. stagnata.* Nuisances: *H. oleracea,*

Spilosoma lubricipeda, *S. menthastri*, *A. exclamationis*, *Rumia cratægata*, *Melanippe fluctuata*, *Melolontha vulgaris* (common cockchafer). This beetle reminds one that there is a tell-tale physiognomy among insects as well as among men, with this difference, that man can, to a great extent, cultivate his facial expression, whilst that of the insect is as fixed, from the first, as its facet-divided eyes. Thus, there is the malignant look of the wasp, the irritable face of the bee, the cold, hard, and repellent face of the aphis, and the utterly mild and inoffensive look of the moth or butterfly. Our cockchafer is a blustering but harmless sort of fellow, and he looks like it. His very obesity commands affection.

JULY.

S. ocellatus, *S. populi*, *N dictæa*, *N. camelina*, *Lithosia complanula*, *Nola cuculatella*, *Thyatira derasa*, *Noctua c-nigrum*, *Leucoma salicis* (one specimen on the 18th. I laid down, some five hundred yards away from where I made this capture, a lot of eggs from Hoylake moths, years ago. As the species is new to the Chester list, the circumstance just related may account for its appearance), *P. iota*, *P. pulchrina* (again here are two species appearing together, very like each other, and yet keeping themselves distinct), *P. chrysitis*, *P. festucæ* (first brood, and rather worn), *P. gamma*, *Tryphæna pronuba*, *T. orbona*, *X. lithoxylea*, *Mamestra persicariæ*, *M. brassicæ*, *A. putris*, *L. impura*, *L. pallens*, *L. conigera*, *L. lithargyria*, *C. cubicularis*, *H. triplasia*, *Tapinostola fulva*, *Bryophila perla*, *Apamea oculea*, *D. cucubali*, *C. umbratica*, *S. menthastri* (one, a late one), *C. blanda*, *H. oleracea* (getting worn and over), *M. literosa*, *N rubi*, *A. exclamationis* (also getting over), *A. betularia* (began to thin off by the 5th), *Cidaria fulvata*, *Uropteryx sambucata*, *Boarmia repandata*, *Eupithecia absynthiata*, *Halia wavaria*, *Selenia illunaria* var. *juliaria*, *Pelurga comitata*, *M. fluctuata*, *T. amataria* (worn), *Crambus tristellus*, *Hydrocampa nymphæalis*, *Tortrix podana* (with the black form), *Aspis udmanniana*, *Schœnobius forficellus*, *Xanthosetia zoegana*. Nuisances: *X. polyodon* (they swarmed, settled on us, and even crawled over us), *Arctia caia*, *L. auriflua*.

AUGUST.

The advent of this month completes a year's observations at our electric lamps. So far—Aug. 18th (the weather "broke" in the middle of the month, as usual)—the present August, in spite of the recent Indian heat, has not been so prolific as last, either in quantity or quality of moths. The following is a representative list:—

N. dictæa.—A collector took four this week, and in fine condition.

N. dromedarius.—Several. I have been very careful about the identity of this moth, as I have always understood it was a June species.

L. auriflua, *Luperina testacea* (some fine forms with the markings on the upper wings black), *Neuronia popularis*, *A. oculea*, *N. rubi*, *X. polyodon*, *X. scolopacina* (one, Aug. 3rd, new to Mr. A. O. Walker's list), *L. complanula*, *E. absynthiata*, *Halia wavaria*, *Crocallis elinguaria*, *Ennomos tiliaria*, *E. fuscantaria*, *Crambus tristellus*, *Paraponyx stratiotalis*, *T. podana*, *Scoparia angustea*, *Catoptria scopoliana* (?), *Hyponomeuta padellus* (small ermine, and far too abundant.)

As a rule, the hours were very happy, and there was plenty of interest in observing, all through the night, how well a town can be placed under watch and ward. The only case I know of where anything like obstruction occurred was, years ago, in a lonely suburb, long before the institution of the electric lights. A tramp—the genus is fast disappearing under the new forms of local government—became inspired with the idea that a solitary collector was worth looting. The matter, however, was eventually arranged by the flight of the enemy.

Chester: Aug. 18th, 1899.

DESCRIPTIONS OF NEW SPECIES OF SOUTH AMERICAN PHYTOPHAGOUS COLEOPTERA.

By Martin Jacoby, F.E.S.

Lema tenuilimbata, sp. nov.

Below black; head and thorax flavous, the latter impunctate, with a lateral black stripe; elytra closely foveolate punctate, flavous, the lateral margins and the apex more broadly black, interstices costate at the apex, the ninth row of punctures interrupted; legs testaceous, antennæ black. Length, 6 mill.

Head finely rugose between the eyes, pale fulvous, clothed with fine yellowish pubescence; labrum black; antennæ scarcely extending to the middle of the elytra, black, the third joint double the length of the second; thorax not longer than broad, but slightly constricted at the sides, the disc smooth and impunctate, obsoletely transversely depressed near the anterior margin, the basal sulcus deep, the sides with a narrow longitudinal black band; scutellum black at the apex; elytra flattened, pale flavous, the punctures very deep and round, closely placed and transversely connected, the interstices strongly costate at the sides and apex, the latter black, this colour extending in shape of a narrow stripe along the sides upwards to the shoulders, leaving the extreme lateral margin of the ground colour, breast, and abdomen black; legs pale testaceous, the femora with an obsolete piceous stripe above; the tibiæ and tarsi also more or less striped with piceous.

Hab. Callanga, Peru.

I know of no similarly marked species of *Lema* belonging to Lacordaire's second division with interrupted ninth row of punctures. *L. mesoxantha*, Kirsh, from Peru, seems somewhat allied in coloration, but has no lateral stripe, differently coloured antennæ, and many other differences.

Lema circumcincta, sp. nov.

Pale yellow; the head, antennæ (the apical joints excepted), the breast, and the tibiæ and tarsi black; thorax impunctate; elytra finely punctate-striate, yellow, narrowly margined with black. Length, 9 mill.

Head impunctate, black, the supraocular grooves very deep; antennæ long and slender, black, the apical three joints flavous; thorax not longer than broad, moderately constricted at the sides, the angles obtuse, the surface impunctate, pale flavous, the basal sulcus rather shallow; scutellum black; elytra scarcely perceptibly depressed below the base, of a greenish yellow, finely punctate-striate, the punctures dark, the ninth row entire, all the margins narrowly black, the shoulders likewise with a black spot, the anterior half of the epipleuræ yellow, the rest black; below flavous, the breast, the upper portion of the femora, and the tibiæ and tarsi black, third joint of the latter fulvous.

Hab. Cachabé, Ecuador (Rosenberg).

The greenish yellow shining upper surface and the details of the black coloration will separate this species from any of its South American allies; there is also a very small black spot placed on the elytra below the base, but whether this is accidental or not I cannot say, as I have only a single specimen before me.

Lema cærulea-lineata, sp. nov.

Black; the apical joints of the antennæ and the femora flavous; thorax impunctate; elytra closely punctate-striate, flavous, a narrow sutural and marginal stripe, abbreviated before the apex, metallic blue; abdomen flavous. Length, 8 mill.

Head impunctate, black, shining, not constricted behind; the antennæ slender, extending to the middle of the elytra, black, the apical two joints flavous; thorax not longer than broad, moderately constricted at the sides, the surface black, very shining and impunctate, the basal sulcus deep; scutellum black; elytra much wider at the base than the thorax, with a rather shallow depression below the base, flavous, finely punctate-striate, the interstices near the apex costate, a narrow sutural and lateral stripe, the last one surrounding the shoulders, all three abbreviated at the same distance before the apex, metallic dark blue; the breast black; the abdomen and the femora flavous, the latter with a black spot or stripe above; tibiæ and tarsi black.

Hab. Bolivia.

Not unlike *L. boliviana*, but with flavous apical joints of the antennæ. This and the colour of the head and thorax will separate the species from *L. trilineata*, Lac., and others of the same division; the narrow elytral blue stripes from *L. boliviana*. Four specimens are contained in my collection.

Lema speciosa, sp. nov.

Flavous; the head, antennæ (the apical joints excepted), the anterior and posterior margins of the thorax, and the tibiæ and tarsi black; elytra metallic blue, the lateral margins and the apex more broadly flavous. Length, 7 mill.

Head black, impunctate, very shining; the eyes deeply notched; antennæ black, the apex of the ninth and the apical two joints flavous; thorax not longer than broad, the anterior angles rounded, the surface with a few fine punctures, flavous, the basal sulcus rather shallow, the disc with a narrow anterior and posterior black band, the latter narrower than the anterior band; scutellum black; elytra with a very slight sutural depression below the base, strongly punctured anteriorly, the interstices at the same place slightly transversely convex, the others rather strongly longitudinally costate from the middle downwards, the entire disc metallic dark blue, the lateral margins narrowly and the apex more broadly flavous, the under side and the femora of the latter colour; the tibiæ and tarsi black.

Hab. Peru.

A species allied to *L. limbatipennis*, Jac., *L. flavomarginata*, Clark, and several others; but distinguished from all by the markings of the thorax in connection with the flavous joints of the antennæ and similar coloured under side.

Lema boliviana, sp. nov.

Black; the thorax impunctate, very shining; elytra much wider than the thorax, with basal depression, flavous, closely and strongly punctate-striate; abdomen flavous. Length, 8 mill.

Head black, shining, strongly constricted behind the eyes, the latter deeply notched; clypeus acutely pointed between the antennæ, the latter black, long, extending a little beyond the middle of the elytra, robust, the fourth joint one-half longer than the third, the following joints equal; thorax as broad as long, deeply constricted at the middle, the basal sulcus deep, placed immediately below the middle, the anterior angles rounded, the surface very shining, black, with a slight bluish gloss, entirely impunctate; scutellum black; elytra broad, distinctly depressed below the base, pale flavous, closely and rather strongly punctate-striate, the ninth row entire, the interstices slightly costate near the apex; the breast and legs black; the abdomen flavous.

Hab. Bolivia.

The elytra in this species are broader at the base than in most cases in this genus, making the thorax appear comparatively small. This and the uniformly coloured pale flavous elytra in connection with the black head, antennæ, and legs will help to distinguish the species.

Lamprosphærus amazonicus, sp. nov.

Dark fulvous; the antennæ (the basal joints excepted) and the legs black; thorax extremely finely and sparingly punctured; elytra remotely punctate-striate. Length, 4 mill.

Oblong or subelongate; the head impunctate, fulvous; the clypeus not separated from the face, entirely impunctate, its anterior margin concave at the middle; antennæ extending below the middle of the elytra, black, the lower three joints flavous, third and fourth joints equal, the fifth slightly longer, terminal joints elongate and slightly thickened; thorax transversely convex, twice as broad as long, the sides strongly rounded, with a narrow margin, the anterior angles slightly thickened, the surface with a few extremely minute punctures, only visible under a strong lens, posterior margin scarcely produced at the middle; elytra slightly wider at the base than the thorax, convex, oblong, the shoulders prominent, distinctly but not very regularly punctate-striate, the punctures as well as the rows distantly placed, the suture not preceded by an impressed line, but by a row of closely placed punctures; sides of the elytra strongly deflexed so as not to be visible from above; legs nearly black, the anterior femora more or less fulvous at the base; prosternum oblong, rather broad, slightly narrowed between the coxæ.

Hab. Amazons.

This is another species of far more oblong shape than the typical forms, but agreeing in the main points with *Lamprosphærus*.

Lamprosphærus flaveolus, sp. nov.

Oblong-ovate, flavous; the apical joints of the antennæ black; thorax remotely punctured; elytra with basal depression, strongly punctate-striate, the punctures distantly placed. Length, 4 mill.

More elongate in shape than the typical species of the genus, of entirely flavous colour; the head distinctly but remotely punctured, the vertex with a central longitudinal groove; the clypeus separated from the face by a transverse depression, remotely but strongly punctured; eyes large; the antennæ extending to the middle of the elytra, flavous, the fifth and the following four joints fuscous, the apical two flavous again, third and fourth joints equal; thorax more than twice as broad as long, of equal width, the sides strongly rounded, with a narrow reflexed margin; elytra oblong, depressed below the base, the surface remotely punctate-striate, the punctures distantly placed, a short row of closely placed punctures is placed near the suture at the base, followed by an impressed or punctured groove which accompanies the suture, the apex of the elytra less strongly punctured than the rest of the surface; elytral epipleuræ moderately broad at the base, flat; prosternum subquadrate, longer than broad.

Hab. Amazons.

I have retained the name for this species given to it by the late Ed. Lefèvre, who examined the insect. The latter is by no means a typical representative of the genus, as the general shape is not ovate or rounded, nor is the prosternum broader than long.

(To be continued.)

NOTES AND OBSERVATIONS.

The Entomology of Northamptonshire.—Referring to Mr. Claude Morley's interesting contribution to the Entomology of Northamptonshire in your current issue (*ante*, p. 222), he remarks that "*Apatura iris* was said to occur at both Helpston Heath and Barnwell Wold, but I never saw it, nor do I know of authentic records." I may say that, when collecting Lepidoptera in Barnwell Wold in the year 1875, I took a specimen of *A. iris* there on July 18th; it was the first I had ever taken, and even now, after the long lapse of years, I can recall how delighted I was at my good fortune; the insect, a fine male, is still in my collection. I never succeeded in taking *A. iris* again in Barnwell Wold, but saw it there subsequently on several occasions, and also at Ashton Wold, a few miles away in the same county.

In the years 1872, 1873, and 1875 I made periodical visits to Barnwell Wold, and amongst the butterflies taken, which are not of universal distribution, were—*Thecla pruni*, larvæ in May, on blackthorn, not uncommon. *T. betularia*, larvæ in June, on blackthorn, plentiful. *Nemeobius lucina*, plentiful in one corner of the wold, end of May and beginning of June. *Carterocephalus palæmon* (*paniscus*), plentiful, May and June. *Argynnis aglaia*, plentiful on rough fields near the wold, July. *Melanargia galatea* swarmed in July, both in the wold and along the roadsides in the surrounding district. *Vanessa c-album*, the only specimen I have seen alive of this insect I captured in Ashton Wold, Northants, in August, 1872.

My captures of Heterocera were of course numerous, and, as my entomological diary for the years mentioned is still in existence, I should be pleased to give any entomologist who may take in hand a Catalogue of the Lepidoptera of Northamptonshire a full list of the species taken by myself in the county during the period mentioned.

In conclusion, I should like to point out that the name Barnwell Wold is really a misnomer, as there is no wold there. Barnwell Wold is, or was when I knew it, a fair-sized wood with a few rough fields near; the term wold is still used, no doubt from the fact that in olden times there were miles of open wolds (rough uncultivated uplands) in this part of Northants; these have long since disappeared before the march of agriculture, and with them has gone, alas! *Lycæna arion* (once plentiful), *Hesperia comma*, and doubtless many others. "Sic transit."—E. Harold Conquest; 58, Hatherley Road, Walthamstow, September, 1899.

Coleoptera of Reigate and its Vicinity. — The Holmesdale Natural History Club, Reigate, have recently published the third part (Staphylinidæ) of the List of Coleoptera of Reigate, compiled by Mr. John Linnell. The first part of this list was issued in 1861, and the second part in 1867. Delay in the production of the present instalment, which—with few exceptions—refers to captures by local collectors between the years 1853 and 1870, is stated to have been due to various causes, but in some measure to the unsettled state of nomenclature and arrangement previous to the publication of Fowler's 'Coleoptera of the British Islands' and 'The Catalogue of British Coleoptera' by Sharp and Fowler. Close on five hundred and fifty species are enumerated in the list; of these four hundred and forty-four were taken in the immediate neighbourhood of Reigate or Red Hill, fifty-seven within a radius of from five to six miles, and forty-eight others at places distant from seven to twelve miles from the town.

Vanessa cardui. — What has become of *Vanessa cardui?* In my rambles around this neighbourhood in the late spring months of the present year, sundry more or less tattered individuals of this species were occasionally met with, and on June 11th, a warm sunny day, it was flying quite commonly over a rough field not half a mile beyond the continuous streets of houses that, in this quarter, form the outer border of London; I waited for some little time watching them, and several times saw two or three of them flying together. On comparing notes with my friends, I learned that they, too, had found the species commonly in many parts of the country, and I naturally looked for an abundant autumn emergence. But quite the reverse is the case. During the later half of August and up to the present time I have paid periodical visits to the same field and neighbourhood; on many of these occasions the days have been delightfully warm and sunny, but not one individual has come under my notice; and during a stay of some three weeks at Eastbourne, terminating on August 14th, one solitary example was the only representative of the species that I met with. *Vanessa atalanta* was fairly common in spring, and both here and at Eastbourne I found it unusually abundant this autumn. The two species have much in common, and the thought that occurs to one's mind is, what special circumstance could have favoured the propagation of the one without being equally advantageous to the other? I may have been singularly unfortunate in my search for the autumn brood of *cardui;* if so, perhaps some of our more fortunate country friends, who have better opportunities for observation than we Londoners, will be able to throw a different light on the subject.—Robert Adkin; Lewisham, Sept. 20th, 1899.

A Correction.—In my paper "On the Nomenclature of the Rhynchota. Part I." (Entom. 1899, pp. 217–21), I proposed to "treat '*Pentatoma*, Olivier,' as a *nomen nudum*." After further consideration, it appears to me that this would not be in accordance with the strict law of priority, for a genus once diagnosed—however insufficiently—ought to be treated as valid, if at all possible. The case is certainly a very awkward one, and the only way out of the difficulty seems to be to treat *Pentatoma*, Oliv., 1789, and *Cimex* (Linn., 1758), Fabr., 1794, as genera practically co-extensive but not co-typical. In the synonymy I proposed (p. 220) no. 1, Cimex, will remain unaltered; for no. 2 read:

"Pentatoma, Oliv., 1789. Type, *rufipes*, Linn., Lam., 1801.

At p. 220, line 26, for "*nigrideus*" read "*nigridens*"; line 36, for "*Philontochila*" read "*Philontocheila*."—G. W. Kirkaldy; Sept. 16th.

Triphæna orbona, *var.*—On July 30th, 1892, I captured, in Cambs, a specimen of *T. orbona* resembling fig. 3 in "Newman." It was exhibited at the meeting of the South London Entomological Society on October 13th in that year. I have now to record a second example, perfectly fresh, taken this year at sugar in my own garden at Woodford on August 1st. To my mind, the recent acquisition is preferable, inasmuch as the light ground shows up the singular markings in bold relief, which the dark ground of the other fails to do. With me, sugaring answered very well the first ten days of August, but since then the numbers of moths gradually declined, gnats being in the ascendant. Query—Did the gnats help drive them away? Certain it is they have been cruel to the genus *Homo*.—Charles Oldham; Woodford, Essex, Sept. 13th, 1899.

Colour of the Larvæ of Amphidasys betularia influenced by their surroundings.—At a recent meeting of the Birmingham Entomological Society Mr. G. H. Kenrick gave an account of an experiment he had tried with larvæ of *Amphidasys betularia.* He had about two dozen larvæ from a pair of black parents; when about a quarter of an inch in length he separated them, putting some into a box lined white, and feeding them on food carefully selected all green; and the others into an ordinary dirty breeding cage, with a liberal allowance of brown twigs in the food. At the end, all in the white box were of the pale green form; in the other box most were dark, one or two very dark, but two also pale; although at the beginning they were all colours and mixed in both boxes; thus showing that uniform pale surroundings had produced all pale larvæ, while variable surroundings had produced a variable lot of larvæ.—Colbran J. Wainwright, *Hon. Sec.*

Mantis Killing a Bird. — In the 'Journal of the Bombay Natural History Society,' xii. no. 3 (1899, July), p. 578, is recorded the killing of a bird by a Mantis. The bird (*Arachnechthra minima*) was hovering round the branch on which the Mantis (probably a female of *Hierodula bipapilla*) was concealed. Whether through fright or no, the Mantis struck at the bird with its fore legs and scalped it. Considering the comparative sizes of the insect and its victim, there is nothing altogether surprising in the occurrence.—G. W. Kirkaldy.

The Common Earwig.—Having occasion to refer to Dr. D. Sharp's first volume on Insects, in the Cambridge Natural History (1895), I was surprised to find that at p. 214 he speaks of the idea that earwigs enter the ear as a superstition. That they ever penetrate the brain, as formerly supposed, is highly improbable; but that they occasionally enter the ear there is no manner of doubt; though such occurrences would naturally be much more common in former times than at present, when people lived out of doors, and were much more in the woods and fields than is the case now. A case was related to me some years ago by a relative of my own, respecting a lady who came out of the garden with an earwig in her ear, which caused her great inconvenience till her sister remembered having heard me say that oil poured into the ear would dislodge any insect that happened to get into the ear; and this remedy was successfully applied. Mr. F. Enock also tells me that earwigs have frequently dropped into his ear when he has been beating bushes, and they have crept in, and remained there, till he has pulled them out by the tail. The term "superstition" is often used nowadays only to indicate that some particular fact does not happen to have fallen within the writer's own personal experience. —W. F. Kirby; Natural History Museum, South Kensington, Sept. 6th, 1899.

CAPTURES AND FIELD REPORTS.

Dianthœcia lutkago var. barrettii in North Wales.—I captured two examples of *D. barrettii* in North Wales last June, about the beginning of the month. In 1897 I took a specimen of this insect in Carnarvonshire (Entom xxx. 222). I may add that *Sesia musciformis* (*philanthiformis*) seemed to be common on the sides of the steep cliffs.—F. C. Woodforde; Market Drayton.

Plusia moneta in Sussex.—On the evening of July 17th last I took a beautiful specimen of *P. moneta* at Cuckfield. It came into the sitting-room, attracted by the lamp, and settling on the table I easily secured it. The species has been identified by an authority. I think it may be interesting to mention that I have kept up the brood of *Clostera anachoreta* (with the help of a friend), the ova of which I found at St. Leonards-on-Sea in 1893. The moths of this season are as fine as any I have bred. (Miss) A. D. Edwards; 55, Gildredge Road, Eastbourne, Aug. 26th, 1899.

Callimorpha hera in Devonshire.—During a fortnight's stay in South Devon, this month, I obtained several specimens of *C. hera*. I took two specimens of the type in very fair condition, and four specimens of the variety known as *lutescens*, three of which are poor, the fourth being good. With one exception the specimens were taken on the wing, in sunny lanes and paths in woods, or at rest. The exception was one *lutescens*, at ten o'clock one night by lamplight.—G. Morel-de-Ville; Liverpool, Aug. 31st, 1899.

Lepidopterous Larvæ on Clematis.—With reference to Mr. A. D. Imms's note (*ante*, p. 240), I took a large number of the larvæ of *Mamestra persicariæ* on clematis (one of the cultivated species) one year during my residence in Burton-on-Trent, including both the varieties mentioned by your correspondent. And this year I have had three specimens sent to me, which were found feeding on a "cactus-dahlia," showing a special preference for the blossoms.—Chas. F. Thornewill; Calverhall Vicarage, Whitchurch, Salop, Sept. 8th, 1899.

Ennomos autumnaria (alniaria), &c.—At Margate, in September, 1898, I captured a female specimen of this insect on the gas-lamp at my front garden gate, and got a batch of eggs, which I divided between some friends and myself, in order to gain experience. The success of my friends has turned out *nil*. My share was fifty eggs, and in the spring I was alarmed by their shrinking in the middle so much that I concluded they were infertile. But I kept them on, hoping against hope. However, forty larvæ emerged, and I fed them upon poplar, dividing them into three batches. I lost one batch almost entirely—those that emerged last; but the others kept healthy, and eventually twelve to fourteen turned into pupæ. On Aug. 29th a lovely female emerged, and I tried unsuccessfully for a week to attract a "wild" male before killing her. She never seemed to make any attempt at flight. On Sept. 6th and 7th I bred one male and two female specimens. Each female has now deposited a batch of eggs; the male is in a battered state, but the females are still in good condition. To-day I bred a second male, and promptly killed him, to secure at least one good specimen of this sex.

Last Friday (the 8th inst.) my gas-lamp attracted *E. fuscantaria*, male;

and a hundred yards away another gas-lamp had on it a female, so I kept the pair together for twenty-four hours. The female has now deposited her eggs. It is curious that *fuscantaria* eggs are laid in one long row, whilst those of *autumnaria* form a large blotch. I think the former must feed on privet here, as there is little or no ash within a mile.

Macroglossa stellatarum has been common here, and both *Colias edusa* and *C. hyale* are now on the wing. Last Saturday I saw five "clouded yellows" in a patch of lucerne close by, but, having a full series and a due care for my neighbour's property, I did not catch one. I have seen perhaps a score in all, so I am hopeful that next season we may have a "clouded yellow" year.—T. P. BARRETT; 3, St. John's Villas, Margate, Sept. 11th.

COLIAS HYALE IN KENT.—Three specimens of *C. hyale* are reported in 'The Field' of Sept. 9th, having been captured on Aug. 28th, in Kent; one on the Island of Sheppey, by Mr. E. A. Cockayne, and two near Southfleet, by Mr. H. Huggins, jun.

COLIAS HYALE IN NORFOLK.—Mr. O. E. Harries also records in 'The Field' the capture of *C. hyale* near Hunstanton, on Aug. 29th.—F. W. F.

COLIAS EDUSA IN DEVON AND CORNWALL.—Several captures of *C. edusa* have been made during the past few weeks in the south-western counties, principally in those above mentioned.—F. W. F.; Sept. 18th, 1899.

CHRYSOPHANUS (POLYOMMATUS) PHLŒAS VAR. SCHMIDTII.—On Aug. 23rd last my wife captured an example of the var. *schmidtii* at Barlaston Downs, Staffordshire. It is a male with rather enlarged black markings, and the basal half of the primaries are beautifully opalescent. I may add that the capture of the specimen is rather remarkable, as the particular object of my wife's visit to Barlaston that day was attained, she having expressed a hope of taking a white var. of *C. phlœas*.—W. F. FROHAWK; Sept. 1st, 1899.

MACROGLOSSA STELLATARUM IN LONDON SUBURBS.—A friend of mine informed me that he had seen a specimen of this species in his garden at Chelsea early this year, and another collector observed one hovering over *Phlox* in a garden at Herne Hill on Aug. 20th.—F. M. B. CARR; 46, Handen Road, Lee, S.E.

MACROGLOSSA STELLATARUM IN EVIDENCE.—As *M. stellatarum* appears to be here, there, and everywhere this season, perhaps an account of its having been mobbed by sparrows may be of interest to readers of the 'Entomologist.' My sister (writing from the Isle of Ely on Aug. 24th) says:—"Our risible faculties have been greatly excited several days in watching the movements of the humming-bird *Sphinx*, as it flitted from flower to flower, with about a dozen old sparrows all the while giving it chase, flying at it, surrounding it, and rushing after it in the most amusing manner. Sometimes there are two or three of them together on the front beds of geraniums, but the cheeky sparrows won't let them have any peace."—CHAS. OLDHAM; Woodford, Essex, Sept. 13th, 1899.

ACHERONTIA ATROPOS IN SUFFOLK AND SOMERSET.—A full-fed larva of *A. atropos* was found on Aug. 22nd, at Chilton, one of the parishes adjoining this place.—EDWARD RANSOM; Sudbury, Suffolk, Sept. 12th, 1899.

A pupa of this fine moth was sent me from Suffolk at the end of July last, and a fine larva was brought me from a potato field near this town early in August. Both have emerged perfect specimens.—(Rev.) A. P. Waller; Bridgwater, Somerset.

Acherontia atropos in Shropshire.—At the end of last month I obtained a fine larva of *A. atropos;* this is now in pupa. It was found feeding on potato leaves in a neighbouring village.—Chas. F. Thornewill; Calverhall Vicarage, Whitchurch, Salop, Sept. 8th, 1899.

Acherontia atropos in the Suburbs of London.—On Monday, Sept. 11th last, a friend of mine, who lives at Thornton Heath, brought me a nearly full-grown larva of *A. atropos*, which he had found in his garden on a cabbage. I knew he was growing some potatoes in the garden, and went to examine the plants on the next evening. I found one or two rows taken up, and the dry stalks lying about. Cabbages were grown between, and the larva had probably strayed on to these when it found its food-plant drying up. On examining the remaining plants, I was delighted to find three more very large larvæ of *A. atropos.* Two of the four have gone to earth since, and the others will follow in a day or two. I have never heard of larvæ of this species in the immediate neighbourhood of London, and though I have had larvæ on several occasions from the South of England, I have not previously seen such large ones as these, which measure nearly five inches in length.—O. Lindemann: 16, Chestnut Road, West Norwood, S.E.

Acherontia atropos in Cheshire.—A fine specimen was taken near Chester about the middle of May last.—J. Arkle; Chester.

Abundance of Vanessa atalanta in Essex.—*V. atalanta* seems to be extremely abundant here. I have never before seen them in such numbers.—Alan W. Cardinall; Manor House, Tendring, near Colchester, Essex, Sept. 6th, 1899.

Vanessa atalanta in London.—I saw a single specimen outside Liverpool Street Station on Aug. 31st.—Alan W. Cardinall.

Vanessa atalanta and Cynthia cardui at Lee.—The former insect has been seen abundantly even here at Lee, visiting the dry treacle patches in the garden. *Cynthia cardui* has also been seen or taken on several occasions. I certainly had not seen a specimen at Lee for several years.—F. M. B. Carr.

Vanessa antiopa in Yorkshire.—A specimen of *V. antiopa* was seen on Oliver's Mount on the 10th inst.—J. H. Rowntree; Scarborough, Sept. 15th, 1899.

Notes on Vanessa atalanta.—*V. atalanta* has been unusually abundant this season in the Epping Forest district. As early as 8 a.m. on the 8th inst., while taking my accustomed morning's stroll through the Forest, *en route* for Snaresbrook Station, my attention was drawn to several specimens of this brilliant butterfly. The centre of attraction appeared to be a small birch (*B. alba*), the trunk of which was almost alive with wasps. While I watched, nearly a score of *V. atalanta* were endeavouring to alight on any portion of the trunk unoccupied by the wasps. As soon as one succeeded it was immediately attacked and driven off, to return again undaunted in a few seconds. Although the butterflies must have been repeatedly stung, they did not appear to suffer much inconvenience.

Attempting to approach closer to the tree, I provoked hostilities on the part of the wasps, and was compelled to beat a hasty retreat. What I wished to ascertain was the nature of the attraction, which I feel convinced was not sugar, as I could see no trace of that substance on the tree. This tree would have been one of the last I should have selected for sugaring, there being many others in the immediate neighbourhood admirably adapted for that purpose. Unfortunately, I was not able to continue my investigations further, as the call of tbe great City close by could not be disregarded.—Ernest Cornell; 6, Vernon Road, Leytonstone, E.

[Probably the bark of trunk had been injured in some way, and the butterflies were attracted by the exuding sap.—Ed.]

Vanessa atalanta.—I have never known *V. atalanta* to be so abundant during the last thirty years as it is this season. It appears equally numerous over the greater part of the country. I have found it the commonest species of butterfly, excepting *Pieris brassicæ* and *P. rapæ*, in Staffordshire, Essex, and Sussex; and I hear of its abundance in Yorkshire and other counties. In consequence of the present dry state of the country, this beautiful insect is a common object in crowded streets and thoroughfares, floating over and resting on the freshly watered roadways in such numbers as to attract the attention of the usually unobserving public. I think there can be but little doubt that there are two if not more broods of this species during the season. The hybernated specimens deposit eggs in May and June, which produce imagines at the end of July and August, these early examples being undoubtedly the parents of those that emerge in September (and perhaps October); otherwise, how are the small larvæ which occur during September to be accounted for, as they are certainly not the offspring of the hybernated butterflies? And, further, I think I have made notes (not now at hand) of finding larvæ in October. Therefore it is highly probable that a succession of broods takes place from July till late autumn.—F. W. Frohawk; September, 1899.

Abraxas (Zerene) ulmata at Brighton.—I captured one specimen on a wall, hardly three hundred yards from the town, in July last.—Alan W. Cardinall.

Nonagria sparganii and Xanthia ocellaris in Suffolk.—Though rather late, it may be of interest to record the occurrence of these two species in the above county. In September, 1893, whilst sugaring near Woodbridge, I took an insect which I was unable to identify, and I placed it with *X. gilvago* and *X. ferruginea*, supposing it must be a variety of one or other of these two moths. I now find it to be undoubtedly *X. ocellaris*. It agrees entirely with the description given in Barrett's new work, having the white dot at the base of the reniform stigma, and the more sharply angulated fore wings, which at once separate it from *X. gilvago* or *X. ferruginea*. *N. sparganii* I took in July, 1897. Whilst searching the stems of *Typha latifolia*, I turned out a green caterpillar, which subsequently pupated, and the imago emerged in the following August. Not knowing any other green caterpillar to inhabit the stems of *T. latifolia* except *N. cannæ*, I confused it with this latter moth. It proves, however, to be *N. sparganii*, which species, I believe, has not hitherto been recorded from Suffolk. I have shown both these moths to Mr. Arthur Cottam, of Watford, who very kindly helped me in their identification.—(Rev.) A. P. Waller; St. May Street, Bridgwater, Somerset.

Caddis-flies at Sugar.—Amongst many other unsolicited guests at sugar, at Hurst Hill, in the New Forest, last August, were two specimens of *Glyphotælius pellucidus*—a female on Aug. 4th, and a male on Aug. 15th.—W. J. Lucas; 12, Caversham Road, Kingston-on-Thames, Sept. 14th.

Eromene ocellea in Hampshire.—On Feb. 21st last I took a specimen of this insect in the New Forest.—Herbert Ashby; Pinehurst, Basset, Southampton, Aug. 30th, 1899.

[See Entom. xxiii. p. 300, pl. iv. fig. 11.—Ed.]

Acronycta aceris.—I can fully endorse Mr. South's note on the unusual abundance of this species in the London district this autumn (*ante*, p. 237). On some trees in a road near my house I have occasionally found some few larvæ in former years as they descended from the upper branches to undergo pupation, but I have never before seen them in anything approaching the numbers that they were in during the middle of August last. Not only were they crawling on the trunks of the trees, but on the ground and on adjacent fences. I noticed that many of these larvæ, after crawling some distance, would settle down on a stave of the fence or some similar position and rest there, sometimes for three or four days, during which time they turned much darker in colour, and eventually died without having made any attempt at forming a cocoon. Of several that I brought home a large proportion behaved in a similar manner, forsaking the food given them, and, after wandering about the cage for some time, settling down on the pieces of cork-bark offered them for the purposes of pupation, and remaining there until they died. I have so far been unable to discover any parasite, nor can I assign any cause of death. The healthy larvæ, on becoming full fed, at once get in among the pieces of cork and there form their cocoons.—Robt. Adkin; Lewisham, September, 1899.

Unusual Visitors to Sugar.—I was much surprised, on Aug. 9th, to take several *Drepana cultraria* (*unguicula*) at sugar. I may mention that Geometers also came freely to sugar on that night, among which were *Zonosoma omicronaria*, *Phibalapteryx vitalbata*, *Camptogramma bilineata*, *Melanippe fluctuata*, &c. I have never seen them like it, before or since.—W. E. Butler; Hayling House, Reading, Sept. 3rd, 1899.

London Lepidoptera.—A correspondent, writing from The Avenue, Brondesbury, but who has omitted to give his name, remarks:—"With reference to the Editor's note (p. 235), I may mention that *V. atalanta* is common here. *V. cardui* was seen in the grounds of St. Paul's School last term. *Macroglossa stellatarum* frequents Hyde Park, and I saw it here twice on Sept. 1st, and once on Sept. 2nd."

Larvæ at Chiswick.—I have much pleasure in recording the following list of larvæ taken at Chiswick this season; and having regard to the fact that they were all taken within the parish, which is very restricted, I consider it a very good one. I have not included some of the commonest species. *Smerinthus ocellatus*, *S. populi*, *S. tiliæ*, *Sphinx ligustri*, *Chærocampa elpenor*, *C. porcellus*, *Macroglossa stellatarum* (in abundance), *Sesia tipuliformis*, *Cossus ligniperda*, *Zeuzera pyrina* (*æsculi*), *Nola cuculatella*, *Liparis salicis*, *Crocallis elinguaria*, *Uropteryx sambucaria*, *Amphidasys betularia*, *Acidalia incanaria*, *Eupithecia subnotata*, *Melanippe ocellata*, *Pelurga comitata*, *Dicranura vinula*, *D. bifida*, *Notodonta dictæa*, *Pterostoma palpina*, *Acronycta aceris*, *A. megacephala*, *Dianthæcia capsincola*, *D.*

cucubali, *Hadena pisi* (again in great numbers), *H. trifolii* (*chenopodii*), *Habrostola triplasia*, *Euplexia lucipara*, *Triphæna comes* (*orbona*), and *Catocala nupta*. In addition, on the Surrey shore, *Notodonta ziczac* and *Gonoptera libatrix* have occurred.

Although working Chiswick for many years, I have not observed *Chærocampa porcellus*, *Macroglossa stellatarum*, or *Pterostoma palpina*, and it is quite ten years since I had the pleasure of taking the larva of *Sphinx ligustri* in this neighbourhood ; in fact, I considered it extinct in the parish.—ALFRED T. MITCHELL ; 5, Clayton Terrace, Gunnersbury, Sept. 18th, 1899.

LEPIDOPTERA ATTRACTED BY ELECTRIC LIGHT AT SHEPHERD'S BUSH.—Among the species either taken or observed during a few visits, at end of June and beginning of July, to the lamps, were the following :—*Smerinthus ocellatus*, *S. populi*, *Sphinx ligustri*, *Zeuzera pyrina* (*æsculi*), *Cossus ligniperda*, *Spilosoma lubricipeda*, *S. menthastri*, *Liparis auriflua*, *L. salicis*, *Uropteryx sambucaria*, *Rumia luteolata* (*cratægata*), *Amphidasys betularia*, *Abraxas ulmata*, *Cidaria associata* (*dotata*), *Halia wavaria*, *Dicranura vinula*, *Acronycta aceris*, *A. megacephala*, *A. psi*, *Agrotis exclamationis* (in enormous numbers), *Axylia putris*, *Xylophasia lithoxylea*, *Hadena pisi*, and *H. trifolii* (*chenopodii*) (commonly). As evidence of the extraordinary power of attraction, I can say without exaggeration that around some of the arc-lamps a hundred specimens could be seen at once ; and on one night, just before a thunderstorm, the sight was a most bewildering and beautiful one. The immense number of insects circling wildly in the zone of light had a most weird effect, and reminded me strongly of a pyrotechnic display. The hind wings of *Agrotis exclamationis* shone like silver, while other species appeared to be bright gold. In five nights this effect was only observed once, and it attracted the attention of numbers of people not interested at all in entomology. Regarding the capture of *Abraxas ulmata*, which is a rather large and very light female, I should like to mention that it was taken, in company with a number of *A. grossulariata*, flying round *Euonymus*. There is a good deal of wych elm about two miles distant, but I do not remember to have seen this species included in the Middlesex list, so that I was quite astonished on proving its identity.—ALFRED T. MITCHELL ; 5, Clayton Terrace, Gunnersbury, W.

A DAY AT OXSHOTT, SURREY. — I managed to get a whole day's collecting at Oxshott, with Mr. J. Wilson, of Lee, and my father, on July 20th last, and was very pleased with the results. Both the country and the insects reminded me strongly of the New Forest. There were two large school-treats on, but these did not trouble us much, except when a small crowd followed us in the fond hope that we were "catching rabbits." Up to about one o'clock, when we had lunch, we did not experience particularly good luck ; but afterwards we did much better ; and if we had not wasted a good lot of time in the evening over treacle, which produced nothing, we should undoubtedly have taken a good many more things, as insects were abundant flying over the heath.

By beating we obtained five examples of *Calligenia miniata*, three *Lithosia complana*, one *L. helveola*, one *L. mesomella*, eight *Platypteryx falcula*, four *P. lacertula*, a few *Liparis auriflua*, several *Metrocampa margaritaria*, four *Ellopia fasciaria* (*prosapiaria*), one female specimen of *Geometra papilionaria* (worn ; I obtained a few eggs), *Hemithea thymiaria*, *Macaria liturata* (getting worn), *Fidonia piniaria* (several, females only), *Acidalia emarginata* (very abundant), *Cabera pusaria*, *Lomaspilis marginata*, *Hypsipetes elutata*, *Boarmia rhomboidaria*, *Melanthia albicillata* (one worn specimen). On the heaths, *Fidonia atomaria*, *Pachycnemia hippocastanaria*, *Pseudoterpna cytisaria*, *Agrotis porphyrea*, and *Anarta myrtilli* were taken; *Gnophos obscurata* was fairly plentiful. Single specimens of *Cidaria immanata* (? *russata*), *C. fulvata*, and *C. pyraliata* were also seen.

Among butterflies, *Lycæna ægon* swarmed on the heaths; and a perfect specimen of *L. argiolus* (second brood) was obtained. *Epinephele ianira* was, of course, common; and *E. tithonus* was just coming out. *Polyommatus phlæas* was in beautiful condition; and *Hesperia sylvanus* and *H. linea* were plentiful.

Larvæ of *Macaria liturata* (?) and *Fidonia piniaria* (?) were taken from the pines; also two *Panolis piniperda*. Two larvæ of *Notodonta chaonia* and one of *Lophopteryx camelina* were beaten; and a few larvæ of *Clostera reclusa* were found on dwarf sallow.

On our way to the station in the evening two *Lithosia complana*, several *Gnophos obscurata* and *Pachycnemia hippocastanaria*, one *Apamea didyma* (*oculea*), and a few *Agrotis porphyrea* were netted flying over the heath; and a great many more things were seen. In the station a specimen of *Acidalia imitaria* finished the day's takings.

A Correction.—In my fen notes (*ante*, pp. 196–199), I see I wrote *Melanippe unifasciata* instead of *M. subtristata* [p. 198, line 15].—F. M. B. Carr; 46, Handen Road, Lee, S.E.

Collecting at Swanage, Dorset.—Rhopalocera were exceptionally common this year; twenty-nine species were taken during a stay from Aug. 1st to Sept. 11th. *Pieris brassicæ*, *P. rapæ*, and *P. napi* were all common; six *Colias edusa* seen, and three taken. Two specimens of *Gonopteryx rhamni*. All the Fritillaries captured were more or less worn; one *Argynnis paphia*, four *A. aglaia*, and one *A. adippe*. Of the Vanessas, *Vanessa atalanta* was the only species at all common, though *V. urticæ* and *Pyrameis cardui* were found. *Melanargia galatea* was fairly common on the Undercliff and Downs. *Epinephele ianira*, *E. tithonus*, *Satyrus semele*, *Cœnonympha pamphilus*, and *Pararge megæra* were all common; *P. egeria* could only be found in one wood. Six *Thecla quercus* were captured flying round ash and oak trees. *Polyommatus phlæas*, *Lycæna agestis*, *L. icarus*, and *L. argiolus* were common; *L. minima*, a few worn specimens; *L. bellargus* and *L. corydon* were abundant on the downs; *L. ægon* on Studland Heath. Three specimens of *Hesperia thaumas*. *H. actæon* was found fairly plentiful on the cliffs.

Of the Heterocera, *Macroglossa stellatarum* was by far the commonest; one could be seen at almost every fuchsia or geranium bed, and I counted eight at once on a small patch of vetch. Among other moths taken were the following:—*Euchelia jacobææ* (the caterpillars of which were common on ragwort; one imago seen); *Dasychira pudibunda* (one larva taken), *Lasiocampa quercus*, *Odonestis potatoria*, *Cerura vinula* (one larva), *Bryophila perla*, *Acronycta megacephala* (larva), *Aporophyla australis* (at sugar), *Cerigo matura*, *Agrotis saucia*, *A. nigricans*, *Triphæna fimbria*, *Scoliopteryx libatrix*, *Acontia luctuosa*, *Metrocampa margaritaria*, *Crocallis elinguaria*, *Gnophos obscurata*, *Hemithea strigata*, *Acidalia scutulata*, *Aspilates ochrearia*, *Anaitis plagiata*. *Asilus crabroniformis* was common on heaths. —S. W. Kemp; 80, Oxford Gardens, Notting Hill, W.

Errata.—P. 238, line 23 from bottom, for "*ante*, p. 179," read "*ante*, p. 169"; line 3 from bottom, for "*ante*, p. 219," read "*ante*, p. 213."

SOCIETIES.

South London Entomological and Natural History Society.—*July* 13*th*, 1899.—Mr. J. W. Tutt, F.E.S., Vice-President, in the chair. Messrs. J. R. Picken, of Brixton; A. A. Buckstone, of South Norwood Park; S. W. Gadge, of Brixton; and G. W. Tombs, of Dalston, were elected members. Mr. Lucas exhibited a finely-marked specimen of *Libellula quadrimaculata* var. *prænubila*, taken at the Black Pond, Esher. Mr. R. Adkin, bred specimens of *Pachnobia hyperborea* from Rannoch. Mr. Turner, the following species and varieties of dragonflies, taken during the field meeting at Byfleet on June 10th:—*Pyrrhosoma nymphula* (*minium*), with *P. tenellum* for comparison; *Enallagma cyathigerum*, with a variety having the longitudinal portion of the black mark on the basal segment wanting; *Ischnura elegans* and a red-bodied female variety; *Agrion puella; A. pulchellum; Erythramna najas; Brachytron pratense;* and *Calopteryx splendens.* He also showed a male *Anax imperator* (*formosus*), and both sexes of the very local *Orthetrum cancellatum*, from Woolmer Forest. Mr. Lucas read a report of the field meeting held at Byfleet on June 10th. Mr. Adkin read a report of the field meeting held at Chalfont Road on July 1st. Mr. Carrington gave a very interesting account of a recent visit he had made to Bradwell-juxta-mare, a village on the Blackwater near Southminster.

July 27*th.*—Mr. F. Noad Clark in the chair. Mr. Fremlin exhibited a store-box of insects he had taken during a holiday at Stornoway, Isle of Lewis, and gave a full account of the neighbourhood from a natural-history point of view. Among the exhibits *Melanippe montanata* and *Camptogramma bilineata* were much varied. Mr. West, a specimen of the snake-fly (*Rhaphidium*) and the Homoptera *Pediopsis fuscinervis*, and *Cixius cunicularis* with var. *dionysii*, all from West Wickham. Mr. Clark, a photomicrograph of the egg of *Eubolia cervinata.*

August 10*th.*—Mr. T. W. Hall, F.E.S., in the chair. Mr. Malcolm Burr exhibited a large number of species of the orthopterous family Eumastacidæ, which he was monographing, and contributed notes on their distribution, with detail drawings by Mr. E. H. T. Schuster, of Oxford. He also showed the specimens of Orthoptera which had been brought from Socotra by Mr. Ogilvie Grant, as a portion of the result of the recent expedition. Mr. Sauzé, a considerable number of insects of all orders, taken in Hampshire and Dorset during his recent holiday there.

August 24*th.*—Mr. Robert Adkin, F.E.S., in the chair. Mr. Edwards exhibited a number of insects of various orders from Borneo and India, including the large bee *Xylocopa latipes* (of which the male has paddle-shaped fore legs), the enormous digging wasp, *Triscolia procera*, the giant ant, *Camponotus gigas*, and several remarkable species of Pompiliidæ, together with a large immature *Tarantula*, specimens of the crab spiders, *Gasteracantha*, and the rare allied genus to the scorpions, *Thelyphonus.* Mr. West exhibited three species of Hemiptera—*Oncotylus viridiflavus*, found on *Centaurea* at Wisley; *Tricopsylla walkeri*, found on buckthorn at Box Hill; and *Terenthia læta*, obtained by sweeping at

Reigate. Mr. Patteson reported that a specimen of *Deilephila livornica* had been taken at Limpsfield at light. Mr. Adkin exhibited a series of *Acidalia aversata*, bred from ova laid by a female captured at Lewisham. The whole brood were dull non-banded forms like the female parent, and very distinct from the ordinary light form.—Hy. J. Turner, *Hon. Rep. Sec.*

Carlisle Entomological Society.—*August 3rd*, 1899.—Mr. J. Murray in the chair. Mr. Murray exhibited the following Coleoptera:—*Halyzia 16-guttata*, from Orton near Carlisle; *Lathrimæum unicolor*, from Whitehaven; and a specimen of the rare *Carabus glabratus*, which was found under a stone on Castlecarrock Fell. Mr. F. H. Day also showed a large number of Coleoptera:—*Bembidium femoratum*, from the banks of the River Eden, near Little Salkeld; *Orectochilus villosus*, under stones on the River Irthing; *Cryptohypnus dermestoides*, Irthing; also *Hypera trilineata*, *Barynotus schonherri*, and *Tropiphorus mercurialis*, taken from among hay. Mr. J. Wilkinson exhibited a very variable series of *Epinephele* (*Enodia*) *hyperanthus*, taken at Orton. The specimens taken in Cumberland differ from those taken in the South of England by the colour of the wings on the under side being paler and sometimes with a yellowish tinge. Several of the specimens had no rings on the under side, and only minute white spots.—G. B. Routledge.

Birmingham Entomological Society.—*August 21st*, 1899.—Mr. G. H. Kenrick in the chair. Mr. Kenrick showed a drawer of Pierines from Thibet and other parts of Asia. It included several species showing a gradual transition from *Pieris* to *Aporia cratægi*, this being particularly marked in *Pieris deota*. He also showed *Agrotis ashworthii*, bred from one of the only two larvæ he had been able to find at Llangollen—the other being ichneumoned; also a specimen of *Acronycta menyanthidis* from Edgbaston, which appears to be the first specimen known in the Birmingham district. Mr. R. C. Bradley exhibited a specimen of *Acronycta alni*, bred from mountain ash at Sutton. Mr. H. Willoughby Ellis said he had a larva sent to him this week from Bransgrove, where it was found on maple. Mr. Ellis showed the following Coleoptera:—*Scolytus destructor* and *S. multistriatus*; the latter was found in some logs near Kingswood, and is a species which has not been known in the Midlands before; as however the logs had apparently been brought to the place where they were found, they had probably brought the *Scolytus* with them from some other district. He also showed *Epurea deleta* from Knowle, and a fine variable series of *Strangalia armata* from Haywood, Warwickshire, all taken this year. Mr. J. W. Moore, insects from the Cambridgeshire Fens: *Leucania straminea*, four bred examples, which he said were the first specimens of the species which anyone had bred; *Leucania obsoleta* (four specimens); a short series of *Senta ulvæ*, and one *Moma orion* (bred), all in grand condition. Mr. C. J. Wainwright, a fine long series of *Anthrax paniscus*, taken in Cornwall this summer. He said that at first he had found them confined to one spot of hot protected sand near the beach at St. Ives, where they settled either on the hot sand itself or on blossoms of *Daucus carota*; before he left Cornwall, however, he had found them much more scattered at St. Ives, occurring especially on *Angelica sylvestris*; and also as far as the Land's End on one side and on the high road not far from Camborne on the other. He also showed continental *Anthrax fenestrata*, *A. maura*, *A. morio*, and *Lomatia lateralis*, for comparison. Mr. G. H. Kenrick communicated the results of an experiment he had made in the treatment of the larvæ of *Amphidasys betularia* (see p. 253).—Colbran J. Wainwright, *Hon. Sec.*

RECENT LITERATURE.

The Direction of the Vienna Museum has lately published two most important monographs upon Rhynchota, and the authors have earned the gratitude of their fellow-students by this highly meritorious work, which, indeed, was only to be expected from entomologists of their reputation.

Anton Handlirsch: *Monographie der Phymatiden.* (Annalen, K.K. Naturh. Hofmuseums,* 1897, xii., pp. 127–230. Plates iv.–ix.; and thirty-five figures in text.)

L. Melichar: *Monographie der Ricaniiden.* (*L. c.*, xiii., 1898, pp. 197–359. Plates ix.–xiv.; and a figure in text.)

Though neither the Phymatidæ nor the Ricaniidæ occur in the British Islands, they would probably be represented among the first consignments of Rhynchota received from correspondents abroad.

The Phymatidæ (Macrocephalidæ according to strict priority) have usually been regarded as allied to the Tingitidæ and Aradidæ; but Professor Handlirsch confirms Schiödte's opinion that they are more closely allied to the Reduviidæ. Nine genera, comprising seventy-three species, are recorded. These are well distributed, Phymatidæ being found almost all over the world, with the exception of the Australian, Ethiopian, and North Palæarctic regions. The anterior legs are carciniform, the femora being enormously incrassate, and in a great many species the connexivum is enormously angularly-dilated, the pronotum being also often angularly produced laterally, so that a somewhat grotesque appearance is presented.

Dr. Melichar's monograph is, in a sense, even more valuable, since there is no recent general Catalogue of Homoptera. The Ricaniidæ, of which thirty-one genera and two hundred and sixteen species are described, are almost entirely tropical, their headquarters being situated in Ceylon and in the Malayan Archipelago.

Considering the enormous number of lepidopterists, it is remarkable that there are so few students of the Auchenorrynchous Homoptera, a suborder which furnishes us with species so greatly resembling some of those of the more admired order, that they would be located in the latter by an untrained eye.

The value of both works is immensely enhanced by the full analytical tables, generic and specific, and by the numerous plates and woodcuts.—G. W. K.

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* Received in this country in 1898 and 1899 respectively. It should also be noted that the "new species" described in the latter were diagnosed previously in the 'Verhandl. zool. bot. Ver. Wien.,' although there is no allusion to this in the monograph itself.

The Micro-Lepidoptera of Guernsey. By W. A. LUFF. 8vo, pp. 11. A reprint of a paper read before the Guernsey Society of Natural History, and published in its 'Transactions' for the year 1898.

Two hundred and eighteen species, including five Deltoids and *Aventia flexula*, are recorded as occurring in Guernsey; three of these—*Tortrix pronubana*, Hübn.; *Adela violella*, Tr.; *Fumea* (?) *lapidicella*, Zell.—are noted as not found in Britain. The general arrangement of the list is on the lines of that of the 'Entomologist Synonymic List,' but *Helias chlorana* is placed with the Tortrices.

Mr. Luff remarks that most of the species referred to were captured in the perfect state, and it would seem that very few of them have been obtained in their earlier stages. Possibly when more attention is directed to the collecting of larvæ of "Micros," a number of additions will be made to the list, and at the same time some of those species now only represented by one example or perhaps a couple of specimens will turn up more plentifully.

We heartily congratulate Mr. Luff on the production of this list, which has evidently been compiled with care. All the species have been examined by high authorities, and the identifications may therefore be taken as correct, a matter, we may add, of the utmost importance in all local lists.

OBITUARY.

WE regret to announce that Mr. SAMUEL STEVENS, of "Loanda," Beulah Hill, Upper Norwood, died on August 29th. He was born on March 11th, 1817, and was therefore in his eighty-third year.

Mr. Stevens joined his brother in business at Covent Garden about 1840, but withdrew again in 1848, when he established a Natural History Agency at 24, Bloomsbury Street. At that time Messrs. Wallace and Bates were about to start for the Amazon, and he undertook to act as their agent in the distribution of the natural history specimens that they obtained. On the death of his brother, in 1859, Mr. Stevens took charge of the auction business in King Street on behalf of the widow, and continued to conduct it until his nephews took over the management. During that time he still carried on the Bloomsbury agency, but in 1867 he sold the business to Mr. Higgins, and thenceforth devoted himself almost entirely to his favourite pursuits, which were, insect collecting, fishing, and water-colour painting, in which art he was an adept. From his early youth he had been an ardent entomologist, but he had always a strong penchant for the practical side of the subject. As a collector of Coleoptera and Lepidoptera he was most successful, and many of the rarer species in each order were captured by him. There are many notes from his pen scattered through the various entomological journals, but he did not estimate his own knowledge and ability at their true value, and consequently he did not contribute very largely to entomological literature. He was a Fellow of the Linnean and Entomological Societies of London; his election into the latter dates as far back as 1837. He was also a member of the Entomological Club from the year 1852. We understand that his collections will be disposed of either as they stand or by auction.

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THE SPECIES OF THE BEE-GENUS *DIEUNOMIA.*

By T. D. A. Cockerell, N. M. Agr. Exp. Sta.

The generic name *Eunomia*, Cresson, being preoccupied, was changed to *Dieunomia* in Entom. xxxii. 14. Taschenberg considered it to be *Cyathocera*, Smith; but that is in reality a synonym of *Steganomus.* Ashmead, on the other hand, has recently identified *Eunomia* with *Monia*, Westwood; but that cannot well be correct, as *Monia* has simple hind legs (Westwood knew the male), and is stated to have "lingua apice lato bifido," and "palpi labiales minuti." When recently at the Academy of Natural Sciences in Philadelphia, I saw the three described species in the Cresson collection, and made the following table for their separation:—

Wings uniformly fuliginous . . . *heteropoda*, Say.
Wings yellowish, hind margin broadly smoky. (♀.)
  Tegulæ piceous; pubescence of thorax very dark seal brown . . . . . *marginipennis*, Cresson.
  Tegulæ light fulvous; pubescence of thorax fulvous . . . . . . *apacha*, Cresson.

To these may now be added the following new species:—

Dieunomia xerophila, n. sp.

Eunomia heteropoda, Ckll. (not Say), Bull. Sci. Lab. Denison Univ. xi. (1898), p. 50.

♂. Length about 20 mm.; black, with very short pale yellowish grey pubescence, very dense on the mesothorax, scutellum, and post-scutellum. Head seen from in front almost circular; middle ocellus larger than the lateral ones; vertex flattened, shining, with scattered deep punctures; face and clypeus densely punctured; middle of face very hairy; first joint of labial palpi as long as the other three together; antennæ long, black, flagellum crenulated above, the last joint dilated and flattened; tegulæ testaceous; wings dark yellowish, apical margin broadly smoky, nervures and stigma dark ferruginous; legs black with brownish grey pubescence, small joints of anterior and middle tarsi dark ferruginous; middle femora greatly swollen, with a keel beneath, which is broadly notched in the middle; middle tibiæ with a low keel beneath, which is curved at its end and terminates in a pointed projection; basal joint of middle tarsi broad and flattened in front; hind femora swollen at the end; hind tibia flattened into an immense triangular body, which viewed from behind is broadly bifid beneath; hind tarsi with the basal joint slender, longer than the others put together; base of metathorax coarsely roughened; abdomen closely punctured, unicolorous, pruinose with short pubescence, which on the hind margins of the segments forms pale bands; third ventral segment elevated at the lower lateral corners, and produced into a spine, from which projects a tuft of hairs; fourth ventral segment with a sublateral nodule on each side.

♀. Similar to the ♂; pubescence of mesothorax, scutellum, and postscutellum extremely dense (except when worn), and ochreous in colour; legs not deformed as in the ♂, pubescence on hind legs quite fuscous, basal joint of hind tarsi broad, with dark ferruginous pubescence beneath; antennæ short, ordinary; hair of ventral surface of abdomen long and warm brown.

Hab. Mesilla Park, New Mexico, Sept. 17th, in a sandy place, ♂ ♀ (*Ckll.*); Aztec, N.M., at flowers of *Verbesina enceli-oides*, Sept. 19th, ♀ (*C. E. Mead*). A larger insect than *D. apacha.* The middle tibia has a spur in both sexes.

Dieunomia mesillæ, n. sp.

♂. Length about 15 mm.; black, differing from *D. xerophila* as follows:—Size smaller; face covered with dense white hair; vertex closely punctured, except on each side of the ocelli; apical joint of flagellum not so broadened, its end truncate; metathorax, except the narrow basal enclosure, very hairy; wings yellowish hyaline, apical margins strongly smoky; legs black, tarsi ferruginous; middle femora fairly swollen, concave, not keeled, beneath; basal joint of middle tarsus ending in a long, narrow, truncate projection; hind femora greatly swollen, triangular in lateral view, the summit of the triangle forming a thick conical eminence, the whole covered with erect grey hair; hind tibiæ with a large, oblique, flattened, quadrangular process of an orange fulvous colour; first three segments of abdomen strongly depressed basally; hair-bands of abdomen very distinct; lateral inferior corners of ventral segments simple. There is no spur on the middle tibia, whereas *D. xerophila* has a single well-developed spur.

Hab. Mesilla, N.M., July 5th, 1898 (*C. M. Barber*). This insect is widely separated from *D. xerophila* by the shorter antennæ, much less dilated at the tip; and also by the absence of the spur on middle tibia, and general structure of the legs.

NOTE.—*Panurginus albitarsis* subsp. *fortior*, Ckll., Entom. May, 1899, p. 129, should stand as *P. innuptus* var. *fortior.* It differs from the typical form in the maxillary palpi, but is hardly separable as a race.

Mesilla Park, New Mexico, U.S.A.: Sept. 26th, 1899.

NOTES FROM RINGWOOD AND DISTRICT.

By J. Hy. Fowler.

The earlier months of the season were very unfavourable to collecting. We had several hard frosts in May and early June, which caused insects to be scarce. Spring moths scarcely appeared at all; larva beating was useless, and has been so for two or three years. Matters began to improve about June. I collected some larvæ of *Callimorpha dominula*, and bred a few good varieties of the species. Two of these are yellow; one orange, quite intermediate between the latter form and the type; two nice ones, hind wings suffused with black, the scarlet being almost invisible; several with the pale spots yellow; and one with the hind wings almost entirely scarlet.

April 3rd. *Xylocampa areola* upon fir trees. 6th. *Cymatophora ridens* and *Earias chlorana* bred; the latter freely, several emerged quite up to June. These might be regarded as a second brood; the same remark applies to late specimens of *Emydia cribrum*. Some pupæ seem to lie over for a time, and in this connection I may mention that I have a pupa of *Vanessa atalanta*, which I have no doubt is a specimen of the usual June brood. Oct. 7th is late for pupa; still, I have known them even later than this. I bred a few *E. chlorana* quite golden green; they were killed by my fingers, so were not discoloured in any way by the cyanide bottle. 16th. *Vanessa io*, *V. urticæ*, *Gonepteryx rhamni*, *Pieris brassicæ*, and *P. napi* were all to be seen in my garden. 17th. *Satyrus egeria*, scarce; *Eupithecia pulchellata*, bred. 27th. *Boarmia cinctaria* out; I have taken many good forms this season. One male is unicolorous grey; another example of the same sex has all the markings a rich brown, the only one of this form I have ever seen; several specimens are white-banded, others nearly white. This species was abundant and continued out up to June. I have seen as many as eleven on one tree. May 5th. *Lycæna argiolus*, very scarce and late. 6th. Netted several moths over honesty flowers, very similar to *Cucullia umbratica*, but not so large. One is almost entirely black. 9th. *Pachycnemia hippocastanaria*, which is usually common, was very scarce. 22nd. *Anthocharis cardamines*, a few; I have not seen a dozen specimens of this species for the last two seasons. 30th. Took cases of *Psyche villosella*, *Fumea roboricolella*, and *Talæporia pseudo-bombycella;* also the first example of *Emydia cribrum.* June 1st. *E. cribrum* well out; also *Scodiona belgiaria.* 3rd. *Corycia temerata; Lithosia aureola* very common, but difficult to net; a fine female *Eurymene dolabraria;* several larvæ of *Nola strigula; Thecla quercus* and *Phorodesma bajularia.* 5th. One *Boarmia cinctaria* seen; several *Epione advenaria; Macroglossa stellatarum* seen. 6th. From this date I netted a good number of *Emydia cribrum* in the New Forest locality; as before noted, they were very much lighter than those taken at Verwood. One female is almost white, the two longitudinal lines are very indistinct, and upon the whole they are all smaller as well. To anyone who is acquainted with the exact spots or localities where this species is found, the opinions of those who have never seen or taken it upon the wing are amusing. A few facts, which would appear to be well known about it, I certainly should like to be enlightened upon (the remarks by Mr. Banks are quite correct), but when I saw St. Lawrence mentioned in connection with *E. cribrum*, I certainly thought we had an Isle of Wight locality for the species. I may mention that the "public-house" at St. Leonards has been converted into a private one for years past. If old collectors remember the "*cribrum* heath" opposite this same house, they will be pleased to hear that I recently took over forty fine specimens there. The heather has grown again, but, heath fires having been so frequent, it is necessary to obtain permission to collect from the Earl of Malmesbury.

It is extraordinary that its habitat in the New Forest was not discovered before. I took it upon a stretch of heath quite two miles long, and think it may extend farther, for this heath was formerly certainly connected with that of St. Leonards and Verwood, say *viâ* Holmsley, Avon Tyrrell, and on to Hurn, which is close to St. Leonards. At the present day, however, the valley of the Avon, with its river, water-meadows, and higher cultivated lands, effectually divide the two localities. Formerly the heath lands and forest was continuous beyond the western boundary of the Avon, so in the olden days there may have been many good spots for *E. cribrum* upon heaths which have since been broken up and cultivated. The New Forest locality is over two hundred feet higher than the others.

June 6th. Two male *Psyche villosella* bred; larva of *Orgyia fascelina* taken; also two male specimens of *P. villosella* upon the wing. 9th. *Nemoria viridata* very common at dusk; also *Scodiona belgiaria*. 13th. Found a dead but fine female *Bombyx trifolii;* a few larvæ of this species were also taken in the spring. 13th. *Emydia cribrum*, a batch of ova laid; changed to purple by the 17th, and larva emerged on 27th, thus proving this species to remain just fourteen days in the egg stage. 14th. *Phibalapteryx lignata*, common in meadows. 15th. One *Anthocharis cardamines; Lithosia mesomella*, common upon the wing at dusk; *Lobophora sexalata* flying by day. 19th. *Hadena dentina* at rest on palings. 23rd. Larvæ of *Thecla betulæ* very scarce; one *E. chlorana*. 24th. Larvæ of *Dicranura vinula* abundant. July 3rd. *Nudaria senex* amongst rushes; *Liparis salicis*, larvæ, pupæ, and imagos all found together upon osiers. 4th. Two *Boarmia roboraria;* larvæ of *Vanessa io* and *V. atalanta* abundant. 6th. *Hepialus humuli*, common; also *Iodis vernaria;* a fine female *Zeuzera æsculi* was brought to me alive; *Zygæna trifolii*, scarce. 7th. Took many pupæ and larvæ of *Nonagria typhæ* from bullrush stems, and bred over a hundred. I kept the stems stuck in wet earth, the exit being exposed, and frequently drenched them with water.

In 1897 I took a few *Caradrina ambigua*, over forty in 1898, and about a dozen this year; the majority on clematis flowers in September, but several were netted as they flew over the heaths.

On the sea-coast I found a nice colony of *Lycæna minima* (*alsus*). They were very large examples. *N. typhæ* pupæ were also plentiful. *Aspilates citraria* was rather scarce. *Acidalia emutaria*, common.

My best captures for the season were fine varieties of *Lycæna corydon.* I obtained about two dozen. Several males are lighter blue than the type; the black borders are absent, but replaced by a row of pure white square spots upon all the wings; those of inferiors are centred with black. Others have the dark borders with large white spaces upon them intervened with black lines. Two females are marked in a similar manner, and appear totally different from the type. I have taken many examples approaching this form both at Dover and near Blandford, but they cannot be compared to the above. Several females have the usual blue markings, and are ringed upon all the wings in the nervular spaces. Streaked varieties were fairly common, also males with orange spots upon upper hind wings.

Two good varieties of *Melanargia galatea* were also taken. These have much more black colour than is usual, and approach var. *procida;* they are a pair. Other specimens taken are very yellow, and one is brownish.

The second brood of *Lycæna argiolus* was abundant. I found five pupæ spun up on dead holly leaves lying upon the ground.

A good many *Colias edusa* have been seen down by the coast. Four specimens also occurred here, but the large New Forest butterflies have been very scarce again this year. *Vanessa polychloros* was common in the larval stage, but not one imago was seen. What becomes of them? Larvæ of *V. cardui* were fairly common. I bred about two dozen. Upon a small isolated heath in the forest I netted three varieties of *Satyrus ianira.* Two are females, and have nearly the whole of the fore wings orange, with a similar coloured blotch upon the hind wings. One is a male, with large, very brilliant spaces upon fore wings. In each case the eye-spots are small. They were the only specimens of the species I could find there.

Ringwood: October 7th, 1899.

DESCRIPTIONS OF NEW SPECIES OF SOUTH AMERICAN PHYTOPHAGOUS COLEOPTERA.

By Martin Jacoby, F.E.S.

(Concluded from p. 250.)

Nodonota venezuelensis, sp. nov.

♀. Dark æneous; the antennæ, tibiæ, and tarsi more or less fulvous; thorax finely punctured, the sides closely aciculate-punctate; elytra very finely geminate punctate-striate, with basal depression, the sides with three or four more or less interrupted costæ.

Var. Antennæ and legs dark æneous. Length, 3–3½ mill.

Head strongly and remotely punctured; the clypeus distinctly separated, punctured like the head; antennæ short and robust, the terminal joint strongly thickened, the apex of each stained with fuscous; thorax twice as broad as long, narrowed in front, the sides rounded, oblique, the surface closely and finely punctured at the sides, less closely at the disc, the interstices extremely finely granulate and sparingly impressed with minute punctures; scutellum impunctate; elytra distinctly transversely depressed below the base, the latter rather strongly punctured in double rows, the posterior portion very finely and more remotely punctate, the shoulders in shape of an elongate tubercle, followed by another rounded one before the depression, the sides below the latter with four or five costæ, which do not extend much below the middle, and are sometimes interrupted into several elongate tubercles, the apex of each elytron rather pointed.

Hab. Venezuela.

I only know the female of this species, which seems closely allied to *N. singularis*, Lefèv., likewise from Venezuela; but this author describes his species as having the head alutaceous and finely and remotely punctured, and the elytra as punctured in rows, and says nothing about a geminate punctuation; nor does he describe any costæ at the sides, but elongate tubercles instead. The antennæ in the present insect are moreover without single erect hairs at each joint, as Lefèvre describes *N. singularis*. *N. costipennis*, Lefèv., differs in the scarcely perceptibly punctured thorax, and other details.

Nodonota boliviana, sp. nov.

♂. Black; head and thorax distinctly but not closely punctured; elytra rather irregularly punctured in rows, the latter partly geminate, distinct to the apex.

♀. Elytra very finely punctured, with a single small tubercle at the sides. Length, 3–3½ mill.

Head very sparingly and finely punctured, sometimes with a metallic gloss, the epistome somewhat obsoletely separated from the face by oblique grooves; the antennæ black, the lower five joints fulvous, the basal joint staine with black above; thorax twice as broad as long, rather strongly narrowed in front, the sides rounded, the angles acute, the surface finely but not closely punctured, the sides more closely punctate, impunctate near the margins; elytra not depressed below the base, finely punctate-striate in irregular double rows, which become single towards the apex, where the punctures are much finer and the interstices slightly convex, at the sides the latter are much more strongly costate in some specimens than in others; below and the legs black, with a more or less æneous gloss.

Hab. Bolivia.

I cannot identify this species with *N. atra*, Har., the only one with which it may be confounded. *N. atra* has evidently been described from female specimens only, having an elytral tubercle; the size is larger, the punctuation of the thorax is described as being more remote at the sides than at the middle, the exact opposite being the case in *N. boliviana.* The elytra, according to Harold, are very obsoletely punctate-striate at the base, but distinctly so near the apex; in the present species this is again exactly reversed. There are nearly a dozen specimens before me which, although varying slightly in the strength of the punctuation, agree in every other way; amongst them is only a single female specimen which has the elytral punctuation much finer, and a single tubercle of very small size placed at the sides below the shoulders.

Nodonota fastitida, sp. nov.

Dark blue or violet; the labrum, palpi, antennæ, and the tibiæ and tarsi more or less fulvous; thorax extremely finely and closely punctured; elytra strongly and rather closely punctate-striate, feebly impressed below the base. Length, 2½ mill.

Head very finely and sparingly punctured, shining, the clypeus more strongly punctured, separated from the face; labrum and antennæ fulvous, the apical joints of the latter rather darker; thorax twice as broad as long, the sides rather strongly rounded at the middle, obliquely narrowed anteriorly, with a narrow reflexed margin, the anterior angles acute but not dentiform, the surface extremely finely and closely punctured throughout; elytra subcylindrical, feebly transversely depressed below the base, the punctuation comparatively strong and arranged in single rather closely approached rows, the punctures themselves, however, distantly placed, the interstices flat throughout; below and the legs greenish, the tarsi more or less fulvous.

Hab. Peru.

Of this species two specimens are contained in my collection, one of them named as above by Lefèvre, but evidently never described; whether the two specimens are, however, specifically identical, I am doubtful, as one of them is more remotely and strongly punctured on the thorax, and has the tibiæ of fulvous colour, and the upper side violaceous. Other differences I am unable to find.

Nodonota cæruleata, sp. nov.

Metallic dark blue; basal joints of the antennæ obscure fulvous; thorax very closely and finely punctured, the sides aciculate-punctate; elytra without depression, very finely punctured in irregular rows, the interstices flat. Length, 3 mill.

♂. Head minutely granulate, distinctly punctured between the eyes, very sparingly so at the vertex and clypeus, the latter separated from the face; the labrum and the terminal joint of the palpi piceous; antennæ black, the lower five joints fulvous, the basal joint black above; thorax twice as broad as long, the sides nearly straight and obliquely narrowed towards the apex, the anterior angles dentiform, the surface subopaque, crowded with small punctures which are not larger at the sides than at the middle, and rather evenly distributed; scutellum impunctate; elytra subcylindrical, with an extremely feeble depression below the base, punctured in irregular rows, which become more remote and rather feeble below the middle, the suture accompanied by an impressed line at its apical portion, the sides likewise with the punctured rows more distinct close to the margins; below and the legs blackish green, the tarsi black and strongly dilated at the anterior legs.

Hab. Terezopolis.

This species, of which I only know the male sex, seems closely allied to *N. venustula*, Lefèv., but the labrum and palpi in that insect are described as fulvous, the sides of the thorax as rounded, and the punctuation of the elytra stronger at the sides and apex than at the base; none of these conditions agree with the species before me.

Nodonota subænea, sp. nov.

♂. Blackish æneous below, above dark æneous or cupreous; the basal five joints of the antennæ fulvous; thorax finely but not very closely punctured; elytra very finely and subremotely punctate-striate, with a basal depression, the interstices scarcely raised.

♀. Elytra with one small tubercle before and two others below the depression. Length, 5 mill.

Head rather strongly and closely punctured, especially so between the eyes; the clypeus still more coarsely punctate, not separated from the face; labrum black, basal joints of the palpi fulvous; antennæ black, the lower five joints fulvous, the basal joint black above, the sixth joint as long as the third one, this very slightly longer than the second joint, terminal joint thick and elongate; thorax scarcely twice as broad as long, narrowed in front, the sides evenly rounded, the angles acutely produced, the disc finely and rather distantly, the sides more closely punctured; elytra convex, pointed at the apex, very finely punctured in irregular rows, distinct to the apex, the interstices at that place and at the sides very slightly raised, the shoulders prominent, the base with a short transverse depression; below and the legs very dark æneous; tarsi bluish.

Hab. Colombia.

Larger than any of the Colombian species described by Lefèvre in the Münch. Mittheilg. from the same locality; the basal joint of the antennæ black above, and the elytral punctuation very fine. *N. pustulata*, Har., of which the female has been described only, has four tubercles below the shoulders of the elytra, and the sides of the thorax are impunctate; *N. bogotana*, Har., has strongly punctured elytra, and the apex of the tibiæ and the tarsi fulvous. I possess two males and one female specimen of the species described here.

Syphaxia maculata, sp. nov. (Galerucinæ).

Robust, elongate and parallel, fulvous; antennæ black, the apical joints fulvous; thorax transverse, sulcate, finely pubescent, with two black spots; elytra greenish, opaque, finely rugose, each elytron with eight fulvous spots. Length, 13 mill.

Of broad subcylindrical shape; the head fulvous, broad, very finely rugose between the eyes, the latter rather small, oblong, entire, frontal elevations only indicated; antennæ stout, not extending to the middle of the elytra, black, the apical three joints fulvous, third joint the longest, the following joints gradually shortened; thorax three times broader than long, the anterior margin strongly concave, the sides rounded and widened at the middle, the angles not produced, the surface deeply sulcate at the sides and longitudinally so at the middle, the impressions very finely pubescent, the base with two obscure blackish spots, rest of the surface not perceptibly punctured; scutellum broad, fulvous, its apex broadly rounded; elytra convex, wider at the base than the thorax, very finely rugose and punctured, opaque and pubescent, greenish, with eight fulvous spots placed as follows: one at the base, two before the middle, slightly oblique, one of narrow and elongate shape below the shoulders, three placed triangularly below the middle, and one at the extreme apex of each elytron; below and the legs fulvous, impunctate and scarcely pubescent; legs very robust, the tibiæ longitudinally sulcate, the first joint of the posterior tarsi very slightly longer than the second; claws simple, thickened at the base; prosternum invisible between the coxæ, the anterior coxal cavities open.

Hab. Calanga, Peru.

Syphaxia is the only genus in which this handsome species, of which a single specimen is contained in my collection, can be placed; the shape of the antennæ, that of the thorax, and the less dilated elytra does not entirely agree with the typical form, which, however, in themselves would not be sufficient to separate the genus. On the other hand, the general structural characters, and of all, the simple claws, robust legs, and open coxal cavities agree with *Syphaxia*. The specimen before me is probably a female, the last abdominal segment being deeply triangularly emarginate at the apex.

NOTES AND OBSERVATIONS.

Mortality of the Larvæ of Acronycta aceris. — Having read Mr. Adkin's note (*ante*, p. 258) relative to the enormous mortality of *A. aceris* larvæ this season, and having had a very large number of them both taken wild and bred from ova, I can say that I have had the same result with both. During the months of July, August, and September I have taken from fences, trees, and crawling on the ground no less than sixty-seven specimens of this beautiful larva, and the localities I have taken them from are Putney, Barnes, Acton, and Chiswick. In spite of all, I have never at one time had twelve larvæ feeding, and the net result has been about thirteen cocoons, and seven of those when opened, instead of containing pupæ, I found enclosed either ichneumous or dried-up larvæ. All those taken wild were apparently healthy, and looked full-fed and about to pupate, but at least fifty of them made no attempt to do so, nor would they eat either sycamore, horse-chestnut, or maple; they simply turned a nasty dull pink colour and dried up. With regard to those reared from ova I experienced the same results, and the few correspondents I sent some to in the North of England and Scotland have all written and informed me that they have done no good with them, so I take it that the disease must have been contracted from the ova. I found that most of those that I reared from ova did well until the last skin, when they died off in the same manner as those taken wild. It may not be out of place here just to give my experience of those bred from ova. I put a female in an ordinary chip-box on Friday, July 7th, and fed her till the Sunday, when she commenced laying her eggs on that night, and continued doing so by night only on Monday, Tuesday, and Wednesday; and, although she laid no more, she fed and lived for over a week afterwards, as I did not turn her out until the first lot of larvæ emerged, and she was then just alive. One thing I particularly noticed and was surprised to see, and that was, that although in some instances the ova deposited touched each other, in no case did they overlap as I have seen them illustrated; also that the young larva on first emerging in nearly every instance made its first meal off the shell of the egg. I think this may account for the eggs not being found on the leaves where the young larvæ are found in a state of nature. I have carefully looked on sycamore and horse-chestnut and found the young larvæ, but never empty ova, and, as they are white after the larva has emerged, they would be conspicuous, and could not be easily overlooked; also, in spite of the larvæ having been so common this year, I never saw more than one on a leaf. I may also mention that I have experienced disease of a similar character in another of this same family, *Acronycta psi*, but not to the same extent. I shall be glad to hear from anyone else who has bred *A. aceris* from ova, if he has done better with them or experienced the same result as myself. I have also heard that this larva has been found in Scotland this year; surely this must be a mistake. — G. F. Leigh; 391, High Road, Chiswick, W.

Larvæ of Acronycta aceris.—I notice in the 'Entomologist' (*ante*, p. 258) a note by Mr. Adkin *re* larvæ of *Acronycta aceris*. I too have taken a good number at Dulwich and Croydon, and have had the same experience with regard to a number shrinking and drying. I think this is due to constipation, owing to the dry state of the food-plant caused by the very hot weather; I had the same thing occur with larvæ of *Arctia caia* earlier in the year.—C. W. Colthrup; East Dulwich.

Lepidoptera from China. — I have only recently seen Mr. Kirby's article (*ante*, p. 31), but I think a few further notes may be of interest.

Crebeta deidamia, Eversm.—March 28th should of course be May 28th, as we only took over Wei-hai-wei on May 25th. This butterfly occurs during May and again in August, and I have taken it both at Wei-hai-wei and Chifu; it has a special liking for steep hillsides strewn with fragments of rock.

Cœnonympha amaryllis, Cram.—Common during the first half of June, and occurs again in August, but more sparingly.

Chrysophanus turcicus, Gerh. = *phlœas*, L. et auct. — The spring specimens are quite typical, but summer and autumn examples are darker, and fall under the head of var. *eleus*, Fabr. They are not, however, nearly so dark as some of the Japanese summer brood.

Pieris daplidice, L.—Common at Wei-hai-wei and Chifu in May and August, and especially fond of patches of dry sand near the beach.

Macroglossa stellatarum, L. — Common at Wei-hai-wei and Chifu almost all the year round; I have taken it from April to October.

Zygæna (*Syntomis*) *phegea*, L.—Occurs during the first three weeks of June. It was abundant in 1898, but this year I only noticed a few. These Wei-hai-wei specimens are peculiar as wanting the characteristic white tip to the antennæ, and so fall under ab. *nigricornis;* this form therefore occurs here, not as an occasional aberration, but as a permanent local race.

On p. 31, line 9 from top, for Len-kung-tan, read Leu-kung-tao (or -tau). — T. B. Fletcher; H.M.S. 'Centurion,' China Station, September 6th, 1899.

Forficula lesnei. — With Mr. W. J. Ashdown, the discoverer of *F. lesnei* in the neighbourhood of Leatherhead, I visited two of its haunts about a week ago. Beating bushes in the hedgerows produced it in considerable numbers; in fact, it was obtained much more commonly than its congener *F. auricularia*, as many as three or four being more than once found in the umbrella at the same time. It is easily distinguished at sight from the commoner species by its much smaller size, its rich sienna-red colouring, and in the male by the shape and colour of the forceps, which look conspicuously pale. Of course, closer examination reveals the fact that there are no wings in either sex. Males occurred rather more commonly than the females, which latter appear to hybernate, for Mr. Ashdown says that he takes this sex only in the spring. Notices was taken of the trees of which the hedges consisted, from which *F. lesnei* were beaten. The following at least were amongst them:—Bramble, hazel, wayfaring-tree, dogwood, blackthorn, whitethorn, elder, ivy, rose, oak, maple, and spindle-tree. The list is long enough, but probably no significance is to be attached to it, as no doubt the earwigs used the bushes simply for shelter or were searching on them for food. *F. lesnei* will eat fruit, and Mr.

Ashdown fed some on rice; probably also they will eat animal matter, and will turn out to be omnivorous like *F. auricularia.*—W. J. Lucas; 12, Caversham Road, Kingston-on-Thames, Oct. 14th, 1899.

CAPTURES AND FIELD REPORTS.

Collecting at Hailsham, Sussex, and at Eastbourne.—Arrived at Hailsham on Aug. 5th, 1899 (2½ hours late, thanks to the L. B. & S. C. R.). We were too late for anything but supper, especially as we were greeted with a heavy thunderstorm. After supper, however, the weather cleared, and about 9.30 p.m. we took a turn round the town. *Bombyx neustria* was fairly plentiful at the gas-lamps, and a nice specimen of *Notodonta ziczac* was taken. The next day showed us pretty much what we had to expect from day-work, which was very slow. Beating produced scarcely anything but *Abraxas grossulariata*, *Asthena candidata*, and some of the Ephyras. The first named absolutely swarmed at night in the hedges, and, though a very common moth, I never remember to have seen it in such enormous numbers before; however, they did not yield any varieties.

Ordinary butterflies were abundant. *Gonepteryx rhamni* was seen occasionally. The three common Pierids were indeed plentiful, but the commonest butterfly was undoubtedly *Epinephele tithonus*, except on the downs, where *Lycæna corydon* was, as usual, an easy first in point of numbers. *Epinephele ianira*, *Lycæna icarus*, *Hesperia linea*, *Polyommatus phlœas*, and *Cœnonympha pamphilus* were all very common. A few worn specimens of *Argynnis paphia* were met with in Abbot's Wood, and *A. aglaia* was plentiful on "The Hide" outside the wood, and was also seen on the downs near Jevington; but all the specimens were reduced to shreds. *Pararge megæra* struck me as not being quite so abundant as usual in this part of Sussex, and the same applies to *Satyrus semele* on the downs. *Vanessa atalanta* was plentiful, and on a poplar tree near Polegate Station, which was riddled with larvæ of *Cossus ligniperda*, my father saw six specimens at once. One beautiful specimen of *V.* (*Cynthia*) *cardui* was taken, and *V. urticæ* was only represented by one specimen. *Thecla quercus* seems to be pretty generally distributed all round Hailsham, but was getting worn. *Lycæna argiolus* was in fair numbers, especially on the outskirts of Abbot's Wood; but this insect always seems to be difficult to obtain in really first-rate condition. One specimen only of *Hesperia sylvanus* was seen. I was informed by a well-known Eastbourne naturalist that *Apatura iris* and *Limenitis sybilla* had been taken during the previous week in Abbot's Wood.

Turning to the moths, *Lithosia griseola* seems to be very generally distributed and common, and at Wannock, on Aug. 7th, one or two came down to nearly every blow of the beating-stick. The variety *stramineola* does not seem to occur here, but it may be of interest to mention that I bred one from eighteen larvæ taken at Wicken in June this year. *Lithosia lurideola* was far less common, only one being beaten. The following were also beaten:—*Liparis auriflua*, *Drepana falcataria* (three), *D. lacertinaria* (two), *Selenia illunaria*, *S. tetralunaria*, *Ephyra omicronaria*, *E. trilinearia* (one), *E. porata*, *E. punctaria*, and *E. pendularia* (the last three being fairly common), *Ligdia adustata* (three), *Timandra amataria*, *Acidalia* *emarginata* (one), *Epione apicaria*, *Rumia cratægata*, *Eubolia mensuraria* (abundant), *Hypsipetes elutata*, *Cidaria testata*, *Cosmia affinis* (one), *C. trapezina*, *Apamea didyma*, and *Triphæna ianthina*.

Aspilates citraria was walked up in several fields and on the downs, but nineteen out of every twenty must have been males. From one female I obtained a nice lot of ova; the young larvæ hatched on Aug. 20th, and are now feeding well on clover.

Catocala nupta, *Bryophila perla*, and *Cerigo matura* were seen at rest. *Eubolia bipunctata* was fairly common on the downs, also empty cocoons of a *Zygæna*, but no moths.

The 10th August was spent at Eastbourne. After a delightful dip, on a broiling hot day, in the briny, we proceeded to scale the inevitable Beachy Head *viâ* the undercliff, which usually teams with butterflies. On the way along the sea-front we found *Macroglossa stellatarum* in some abundance, but mostly in poor condition.

Arrived on the downs, we found *Lycæna corydon* in its usual profusion, but *L. bellargus* was only just coming out, and we had to content ourselves with two fine males. While securing a specimen of *L. corydon* I found a full-grown larva of *Chærocampa porcellus* on yellow bedstraw. A few *Aspilates citraria* and one *Melanippe galiata* were about the only other insects. Another specimen of *M. stellatarum* was seen in the restaurant at the top of the Head.

We returned to Hailsham in time to treacle. As at the fens in June, treacling was the most satisfactory mode of collecting, over sixty species being noticed during the week. The two best nights were the 10th and 12th, when moths positively swarmed. On the first date there were forty-three species, and on the second forty-four. The following were noticed at treacle:—Three worn *Lithosia complana* (from one female I obtained ova, which have since hatched), *Lithosia griseola*, *Epione apiciaria*, *Boarmia rhomboidaria*, *Acidalia emarginata* (one), *A. aversata*, *A. bisetata*, *Asthena candidata*, *Cabera pusaria*, *Hypsipetes elutata*, *Camptogramma bilineata*, *Cidaria testata*, *Ephyra omicronaria*, *E. punctaria*, *E. porata*, *E. pendularia*, *Coremia propugnata*, *Ligdia adustata*, *Lomaspilis marginata*, *Cymatophora duplaris* (two very bad specimens), *Acronycta ligustri* (a perfect specimen), *Leucania pallens*, *Miana literosa*, *M. furuncula*, *Xylophasia polyodon*, *Agrotis suffusa*, *A. puta*, *A. exclamationis* (one), *A. segetum* (one), *Noctua baia* (very common), *N. xanthographa*, *N. umbrosa* (one), *N. dahlii* (one), *N. rubi*, *N. triangulum* (a worn example), *N. c-nigrum* (two), *N. plecta* (several), *Hadena oleracea*, *H. thalassina* (a fine example), *Apamea didyma* (very abundant), *A. ophiogramma*, *Triphæna fimbria*, *T. ianthina* (abundant), *T. interjecta*, *T. pronuba*, *T. orbona* (abundant), *Cosmia trapezina*, *C. affinis*, *Mamestra brassicæ*, *M. anceps* (*?*), *Cerigo matura* (*cytherea*), *Hydrœcia nictitans* (some with red discoidal spots), *H. micacea*, *Caradrina cubicularis*, *C. blanda* (*?*), *Amphipyra pyramidea* (two), *A. tragopogonis*, *Gonoptera libatrix*, *Phlogophora meticulosa*, *Mania maura*, and *Catocala nupta*.

I think light would have paid well, too, had we been able to work it properly. As it was, the following were noticed:—*Bombyx neustria*, *Liparis auriflua*, *Lithosia griseola*, *Ptilodontis palpina* (one), *Crocallis elinguaria*, *Pseudoterpna cytisaria* (one lovely coloured specimen; I do not remember taking one in good condition so late as Aug. 8th before), *Boarmia rhomboidaria*, *Aspilates citraria*, *Cabera pusaria*, *Hydrœcia micacea*, *Luperina testacea*, *Xylophasia polyodon*, and *Apamea didyma*.

Lophopteryx camelina, *Calligenia miniata*, *Lithosia griseola*, *Cilix spinula*, *Epione apiciaria*, *Halia vauaria*, &c., were taken on the wing in the evening, and in the underground passage at Polegate Station we found, among other things, a good female of *Bombyx quercus*, which I kept for eggs, and a good specimen of *Dianthœcia cucubali*.

Larvæ were distinctly scarce, the following being the only species noticed:—*Smerinthus ocellatus* (on sallow), *Chærocampa porcellus* (one), *Dasychira pubibunda* (small), *Orgyia antiqua*, *Pygæra bucephala* (very tiny), *Hylophila prasinana*, *Acronycta megacephala*, *Euclidia glyphica*, *Ligdia adustata*, and a few other geometers.

An evening in the marshes was only noticeable for the quantities of common insects at bramble-blossom, *Lithosia lurideola* (two), *L. griseola*, and *Triphæna interjecta* (one) being the best of the rabble. I was rather struck, when treacling on Aug. 11th, to find thirteen specimens of *Asthena candidata* on the trunk of a tree which had not been treacled since Aug. 6th. I put some more treacle on, and the tree presented a very curious appearance a little later on—the *A. candidata* had returned, and there were also two lovely specimens of *Catocala nupta*, several smaller Noctuæ, and one *Epione apiciaria*. There were scarcely any *Asthena candidata* at the other trees.

We returned home, after a very pleasant holiday, on Aug. 13th.

Having occasion to visit Eastbourne on Aug. 26th and 27th, I was only able to do about an hour's collecting. About the only change on the downs worthy of notice was the substitution of *Lycæna bellargus* for *L. corydon*. A nice specimen of *Vanessa cardui* was seen, and among other insects observed were *Satyrus semele*, *Pararge megæra*, *V. urticæ*, *V. atalanta*, *Macroglossa stellatarum*, *Aspilates citraria*, *Melanippe galiata*, *M. fluctuata*, *Acidalia marginepunctata*, *Luperina testacea*, *Plusia gamma*, and *Bryophila perla*.—F. M. B. Carr; 46, Handen Road, Lee, S.E.

Collecting at Folkestone.—While staying at Folkestone for a fortnight in July, I managed to take a few very good insects, including *Melanargia galatea*, *Lycæna alsus*, *Sesia ichneumoniformis*, *Trochilium crabroniformis* (*bembeciformis*), *Leucoma salicis*, *Porthesia chrysorrhœa* (seven males), *Notodonta dictæa* (one male), *Bryophila glandifera* (very variable), *B perla* (dark vars.), *Xylophasia sublustris*, *Caradrina alsines*, *C. blanda*, *Aspilates gilvaria*, *Angerona prunaria*, *Hemithea strigata*, *Acidalia ornata*, *Melanthia procellata*, *Phibalapteryx tersata*, &c.—W. E. Butler; Hayling House, Reading, August, 1899.

Collecting in Kent.—On Aug. 29th I paid a visit to Bowley Mill, near Charing, Kent. Butterflies seemed scarce: *Epinephele ianira*, *Vanessa urticæ*, *V. atalanta*, *Pieris brassicæ*, *P. rapæ*, *P. napi*, *Pararge megæra*, *Lycæna icarus*, *Cœnonympha pamphilus*, and *Polyommatus phlœas* were on the wing; but sugar was very productive for the common species; *Leucania pallens*, *Hydrœcia nictitans*, and *Noctua xanthographa* simply swarmed; I could have taken five or six hundred if I had wished to. *Noctua rubi*, *Amphipyra tragopogonis*, and *Phlogophora meticulosa* occurred more sparingly; while I took single specimens of *Agrotis suffusa*, *Hadena oleracea*, *Heliophobus popularis*, and *Triphæna orbona*. The Geometers were represented by a single species, *Coremia propugnata*, which was tolerably common.—S. A. Blenkarn; Clifton House, East Dulwich Road, S.E., Oct. 9th, 1899.

Collecting in the Maidstone District.—I spent from the second week in August to the last week in September at my home near Maidstone, but did not give very much time to collecting. *Macroglossa stellatarum* was very common indeed. A bed of verbenas in our garden seemed a special attraction for them; there were often as many as six or seven hovering over the blossoms at the same time. Among other species that I took were *Crocallis elinguaria, Plusia iota, Gonoptera libatrix, Mania maura*, and *Catocala nupta*. The larvæ of *Chœrocampa elpenor* were fairly abundant along the banks of streams and ditches. The larvæ of *Sphinx ligustri* were conspicuous on the privet hedges, but not in such abundance as last autumn. At the entrance of one of the hop-gardens I came across a half-grown larva of *Cossus ligniperda* burrowing its way into the earth, and a few yards away on one of the hop-poles was a freshly emerged *Triphæna fimbria*. On Sept. 25th I had brought me a fair specimen of *Acherontia atropos*, which was found in one of the potato fields.—W. Gandy; Beech View, Reigate, Surrey, Oct. 12th, 1899.

Collecting in Norfolk.—Not having noticed lately in your journal any account of captures in Norfolk, I thought a list of a few insects obtained near Norwich during August and September might be acceptable. The following were taken at sugar:—*Catocala nupta* (abundant and fine), *Agrotis suffusa* (common), and *A. saucia* (one specimen), *Noctua c-nigrum* and *N. xanthographa* (both species abundant and varied), *Triphæna pronuba* (abundant), *Amphipyra pyramidea, Xylophasia polyodon, Hadena adusta, Dianthœcia cucubali* (one specimen taken in the middle of August, surely rather late), and *Phlogophora meticulosa* (very abundant all through September, and practically the only insect seen at sugar during that month). *Macroglossa stellatarum* was very common on geranium beds, also *Vanessa atalanta*, which I frequently saw on the tree-trunks which I had sugared. The following larvæ were also taken:—*Cerura vinula, Acronycta aceris, Sphinx ligustri, Smerinthus ocellatus, S. populi, S. tiliæ, Arctia caia, A. lubricipeda, Pygæra bucephala, Acronycta tridens* and *A. psi*.—W. T. Harris; 17, Micheldever Road, Lee, S.E.

Lepidoptera in Moray.—The past season has been highly favourable to these insects. Two species, ordinarily of occasional occurrence in Moray, have been unusually abundant—*Pyrameis atalanta* and *Lycæna phlœas*. Several larvæ of *Manduca* (*Acherontia*) *atropos* have been found, and imagines of *Phlegethontius* (*Sphinx*) *convolvuli*, and *Macroglossa stellatarum* have been captured.—Henry H. Brown; Rosefield, Elgin.

Aporia cratægi.—I have again the pleasure to record the capture of this insect, although I took but eight specimens. Several other collectors have taken them, but not in any numbers, and they certainly seem to be getting scarcer year by year. The first time I took *A. cratægi* was in 1896, so they appear to be holding their own; but this, coupled with the sheltered position of the locality, may be on account of the exceptionally mild winters which we have experienced of late. Anyhow, the species should hold out for some years yet, as it certainly has not been over-collected—at least, not by me.—H. Douglas Stockwell; 2, Albert Road, Dover, Oct. 19th, 1899.

Colias edusa in Sussex.—I captured a female specimen of *C. edusa* on the 19th inst., at Slindon, near Arundel, Sussex, the only one I have seen this summer.—LEWIS S. GILES; 1, London Road, Norbury, S.W., Sept. 22nd, 1899.

COLIAS EDUSA AT CHICHESTER.—One or two specimens of this butterfly were seen at Chichester in August.—JOSEPH ANDERSON.

COLIAS EDUSA IN SOUTH DEVON.—I took a male specimen of *C. edusa* on Sept. 25th last, between Uffculme and Blackborough, about seventeen or eighteen miles inland from Sidmouth. The example was in perfectly fresh condition, and appeared to be recently emerged. The sun was obscured at the time, and the insect was flying in a very half-hearted manner, so that I had time to fix up my net for its capture.—H. W. BARKER; Halberton, near Tiverton, Devon.

COLIAS EDUSA AND C. HYALE AT DOVER.—Of the former species I took a poor male on Aug. 22nd, and saw another, but had no chance to net it. These are the only live specimens I have seen this year. *C. hyale* has been more in evidence; three were taken and three more seen by a friend of mine in a lucerne field near Walmer on Aug. 28th. I took one on Sept. 6th, in the same field, which was probably one of those my friend failed to capture, as it was rather worn, and had almost got to the end of its rope; but for all that it wanted a deal of catching.—H. DOUGLAS STOCKWELL; 2, Albert Road, Dover, Oct. 19th, 1899.

COLIAS EDUSA AND C. HYALE AT ERITH.—I have seen two or three *C. edusa*, and have heard of a few others that were observed in this district last August, but am told that those taken were not in good condition, appearing either to have travelled far or been out a long time. I noticed a fine male *C. hyale* here on 6th ult., and one of my sons saw two or three others a day or two afterwards, one of which he netted, but it also was much the worse for wear.—E. SABINE; October, 1899.

VANESSA ATALANTA, &c.—I have found *V. atalanta* very plentiful in Kent, Surrey, Sussex, and Hampshire, and saw a large number at ivy blossom on a railway bank near Ramsgate, and had a similar experience to Mr. Cornell (*ante*, p. 256) at Malden, Surrey, where I saw a number flying round and settling on the trunk of a beech-tree which was swarming with wasps. I noticed that the tree was nearly leafless, and looked as though it were dying. The *atalanta* were so busily engaged that I was able to pick one off with my fingers in brilliant sunshine. Of *V. cardui* I saw a fair number on Sept. 5th, but *V. io* I have not seen in either of the four counties named, but heard of its being taken near Margate.—C. W. COLTHRUP; East Dulwich.

VANESSA ATALANTA PLENTIFUL IN THE ROTHERHAM DISTRICT.—All through September *V. atalanta* has been quite a common insect. Several could be counted at the same time. A few days in the middle of the month a pear-tree in the gardens here, having a few pears on it pecked by the birds, was quite an attraction, in fact, quite a pretty sight with the butterflies, dozens at a time, flying and sitting about the tree. The lanes and fields had not been forsaken, for up to Oct. 6th and 7th *V. atalanta* was to be seen in them also.—W. BROOKS; Grange Hall, Rotherham, Oct. 9th, 1899.

VANESSA ATALANTA AND VAR. AT ERITH.—This has certainly been an *atalanta* year. From the end of July till within the past day or two the species has been very much in evidence here in all stages, imagines, larvæ of all ages, and pupæ being readily obtainable at one and the same time, and in almost any numbers too, especially larvæ. But there has been little or no variation in the perfect insect, as far as my own experience goes. Out of some six hundred that I have already bred, I have met with hardly anything worth recording; and yet, wonderful to relate, a friend, till lately a resident here, Mr. B. P. Kemp, obtained a grand var. from one of (only) three larvæ that he had casually found in this neighbourhood! It much resembles that figured in Entom., August, 1878, but the bands on hind wings are without spots, and it has a small *white* spot on the black discs of said wings. The under side is really magnificent. Through the kindness of my friend I am enabled to add this beautiful specimen to my series. I have still quite a number of pupæ and some larvæ, and doubtless, if weather is at all favourable, more will be readily obtainable. I observe that Mr. Frohawk, in his note (*ante*, p. 257) states that he found the larvæ in October. I have taken them in November (see Entom. xxvi. 16). I would only add that some of our more immediate neighbours, who are aware that I am an entomologist, have lately been loud in their praises of the numbers of very beautiful butterflies they have seen in their gardens this autumn, and have been unable to account for their great abundance, until informed that they had mostly been captured or bred, and, after examination, released by myself. Some of our friends were greatly surprised and interested on seeing the various stages of the breeding process in my cages.—E. SABINE; Oct. 2nd, 1899.

VANESSA C-ALBUM.—This species appears to me to be getting scarcer every season where it formerly was plentiful; in the hop-grounds in this locality I have visited several large plantations within the last week with small results. I attribute the scarcity to the different washes, &c., used for cleansing the plant during the period of growth.—W. EDWARDS; Malvern.

LYCÆNA BŒTICA AT WINCHESTER AND DEAL.—Mr. H. W. Shepherd-Walwyn, of Bidborough, Tunbridge Wells, reports the capture of a specimen of this species at Winchester, on Sept. 1st, this year. Mr. James H. Parry, of St. Augustine's College, Canterbury, informs us that he has taken one at Deal on the 16th of the same month. Curiously, each of these specimens was sitting on a window.

LYCÆNA ARGIOLUS AT ERITH.—In common justice to this delicate little species, I think I ought to record its great abundance here this season. Both broods were exceedingly numerous, even in our garden, several being on the wing at the same time, to my mind adding much to its charm, especially in the earlier part of the summer. I have heard, too, that it was exceedingly plentiful at Bexley Heath and other places round about the neighbourhood.—E. SABINE; October, 1899.

ACHERONTIA ATROPOS IN BUCKS.—A friend of mine caught one specimen at Marlow in August. It fell from the top of the door of a room in a friend's house, and he immediately caught it.—ALAN W. CARDINALL; 18, Cromwell Road, Hove, Oct. 1st.

ACHERONTIA ATROPOS IN DEVONSHIRE, &c.—Two specimens have been sent me by correspondents during the last week—one from Turnchapel, near Plymouth; another—a grand moth, five inches from tip to tip—from Bishopsteignton. Further captures are reported from Braunton, by a correspondent who has taken four. One was also taken at Lostwithiel

(Cornwall); it was brought into the house by a cat.—C. W. BRACKEN; 15, Lipson Avenue, Plymouth.

ACHERONTIA ATROPOS IN HAMPSHIRE.—Four pupæ of *A. atropos* were brought to me about the middle of September. They were all found in this neighbourhood. One was dead when it came into my hands; the others were placed in a greenhouse, where they were subjected to considerable heat, and the imagos emerged between Sept. 21st and the beginning of October.—WILLIAM M. CHRISTY; Watergate, Emsworth, Hants.

ACHERONTIA ATROPOS IN KENT.—I had a full-fed larva brought to me during the first week in August. It was taken in a potato-field on the outskirt of the town, and at once pupated. The imago emerged on Sept. 17th, having been only about a month in the pupal stage. The pupa was, of course, forced, and this was done by its being placed in a box on a shelf over a gas-stove. Several more larvæ have been found in this neighbourhood, and also at Deal, and I heard of an imago being taken here in the town the early part of the present month.—H. DOUGLAS STOCKWELL; 2, Albert Road, Dover, Oct. 19th, 1899.

ACHERONTIA ATROPOS IN LINCOLNSHIRE.—The fine dry summer of 1899 appears to have been favourable to the larvæ of *A. atropos*, for on Sept. 3rd and 5th consignments of a dozen fine pupæ reached me. On Sept. 25th one imago emerged, and on the 26th another fine example was added, and on the 28th a third was noticed trying to extricate itself from the pupa-case, but, doubtless owing to a slight injury to pupa, this one proved to be a cripple. On Oct. 4th two dozen more pupæ were safely received, thus clearly showing that the species must have been fairly common on the potatoes in the Long Sutton district.—W. BROOKS; Grange Hall, Rotherham, Oct. 9th, 1899.

ACHERONTIA ATROPOS IN SUSSEX.—On June 20th a specimen of *A. atropos*, caught by a labourer, was brought to me at Chichester. He had kept it a week in a bottle, the result being that the condition was not all that could be desired. Another moth was taken on Sept. 19th, an extremely fine female, in fine order. Several larvæ and pupæ were found in this neighbourhood.—JOSEPH ANDERSON.

This species seems to be fairly plentiful at Slindon, as I received both larvæ and pupæ from that district.—LEWIS S. GILES; 1, London Road, Norbury, Sept. 22nd, 1899.

ACHERONTIA ATROPOS IN WORCESTERSHIRE.—I have had seven larvæ and two pupæ of *A. atropos* brought to me at Malvern. All were found in gardens, among potatoes. I have also heard of several others being obtained in this neighbourhood.—W. EDWARDS; Malvern.

SPHINX CONVOLVULI AT DOVER.—A nice specimen was taken last month by a local collector in the Connaught Park here, and I had one brought to me the early part of this month, but it was in bad condition and of no use. When over at Deal, on the 1st inst., I picked one up in the road, which some one had evidently stamped upon, as the poor thing was crushed, and this was also of no good.—H. DOUGLAS STOCKWELL; 2, Albert Road, Dover, Oct. 19th, 1899.

SPHINX CONVOLVULI AT MALVERN.—One example was captured in a dining-room here, and another as it was flying over *Nicotiana affinis*. A third specimen was seen, but not secured.—W. EDWARDS; Malvern.

Sphinx convolvuli at Bridgwater.—A fine male was taken in my son's garden at Bridgwater, by his wife, on Sept. 11th; it was flying over the *Nicotiana.*—Arthur Cottam; Eldercroft, Watford.

Sirex juvencus in Moray.—A female of this hymenopteron was taken on Sept. 13th last, by a workman employed near the harbour at Hopeman, on the Moray Firth. No large woods are near the village. The finder thought it came from the direction of a foreign vessel in the harbour.—Henry H. Brown; Rosefield, Elgin.

Macroglossa stellatarum in the City.—While passing down Gresham Street to-day (1.40) I noticed a small specimen of *M. stellatarum* settled on the window of a warehouse.—S. A. Blenkarn; Clifton House, East Dulwich Road, S.E., October 11th, 1899.

Macroglossa stellatarum at Eastbourne and Ramsgate.—This species was very plentiful at Eastbourne and Ramsgate in fields of lucerne, and I took one at rest on a clothes-post against a wall at the former place. It was hanging on the clothes-line which was round the post, and looked exactly like a knot till I examined it closely. It was evidently freshly emerged, as I succeeded in taking it home in a small pill-box, where it remained quite motionless after the first movement when I transferred it. I should like to know if any of your correspondents have taken it in a similar position. I also saw a specimen of the same species hovering over flowers in my garden at East Dulwich on the 30th ult.—C. W. Colthrup; East Dulwich.

Macroglossa stellatarum at Luddenden Foot.—On September 28th I caught a good specimen of *M. stellatarum* in our house, and one or two others have been seen in the garden. In the 'Halifax Naturalist' for this month there is an account of two being captured at Elland. These, I believe, are the first records for this district.—Arthur Robertshaw; Ellenroyde Hall, Luddenden Foot.

Macroglossa stellatarum at Erith.—This species has been very numerous here this autumn, and from what I can gather the same state of things has obtained pretty generally round and about the district.—E. Sabine; Erith, Oct., 1899.

Macroglossa stellatarum at Haslemere.—The humming-bird hawk-moth has been frequently seen in the garden this summer. The flowers generally seem to attract it, perhaps lavender especially. This morning, at half-past seven, one was seen at the petunias; weather dull and gloomy, with soaking dew.—T. P. Newman; Hazelhurst, Haslemere, Oct. 23rd, 1899.

Macroglossa stellatarum at Malvern.—*M. stellatarum* has been very abundant in this neighbourhood, flying over the scarlet geranium, and still fresh specimens may be seen. I took one on September 22nd, apparently just emerged.—W. Edwards; Malvern.

Notes from Bucks.—My brother and myself were fortunate in obtaining three larvæ of *Stauropus fagi* in a small wood near here. The first was beaten from oak on Sept. 9th, and pupated on the 13th; whilst of the other two, beaten from oak and beech, one spun up on the 21st, and the second is still feeding. *Macroglossa stellatarum* has been unusually abundant here during the season. This district appears to be a good one for

Lepidoptera, and would doubtless be still better if there were more oaks in the neighbourhood; as it is, every wood is largely composed of beech.—Ernest Peachell; High Wycombe, Bucks, Sept. 22nd, 1899.

Arctia caia Caterpillar attacked by a Spider.—At Chichester, on May 11th, I found a fairly large caterpillar of the above species under a coping (where it had evidently gone to change its coat) having a regular it and making sundry darts at it. I succeeded in extricating the caterpillar, fight with a small spider, which was busily engaged winding its thread round which had evidently not been entangled long enough to be hurt, as it afterwards fed up and came out a perfect specimen. I communicate this, as I do not know whether it is known that caterpillars of this size are attacked by small spiders.—C. W. Colthrup; 127, Barry Road, East Dulwich, S.E., Oct. 10th, 1899.

Smerinthus tiliæ Aberration.—A specimen of *S. tiliæ*, which I obtained from the larva this spring, differs from others on account of the absence of any markings on the fore wings, and it has only very slight markings on the hind wings. I obtained the larva last autumn, crawling down an elm tree at Hammersmith, and soon after I got it, it changed into the pupa state, and the moth came out in May last.—A. T. Betteridge; London and County Bank, Watford, Sept. 21st, 1899.

A Second Brood of Smerinthus populi.—A friend of mine, L. F. Cathcart, had some ova of *S. populi* given him in May or thereabouts, and was successful in rearing them to the pupa. In August he was surprised to find that five had emerged.—Alan W. Cardinall; 18, Cromwell Road, Hove, Brighton.

Cucullia chamomillæ at Chichester.—A number of larvæ of *C. chamomillæ* were found feeding on *Anthemis tinctoria* in her garden at Ryman's Tower, Apuldram, by my friend Mrs. Fogden, who gave them to me.—Joseph Anderson.

Triphæna subsequa at Malvern.—I have the pleasure of recording the capture of *T. subsequa* by self and friends in this neighbourhood. I have collected in this locality for many years, but have not previously met with this species. Five examples were take at sugar.—W. Edwards; Malvern.

Chrysophanus (Polyommatus) phlœas at Erith.—This pretty little species has been unusually abundant about here this autumn, and during the past month my son has captured quite a number of varieties; in fact, I have never obtained so many in any one season, not excepting the great "copper" year of 1893. They embrace a gold-coloured female; a grey and straw coloured male, having one side paler than the other, all the wings being very shining and somewhat iridescent; several with portions of one or more of the wings bleached; some four or five with elongated wedge-shaped spots, approaching streaks; a few with the hind wings more or less suffused with copper; two or three coppery in place of blue spots; and seven or eight minus the red band on hind wings, but having from one to five red pencil-like streaks in place thereof. One or two also are "odd-sided," the spots or markings being quite different on either primary. I am afraid this unsettled weather will put a stop to further collecting. Last season I took perfectly fresh specimens of this species up to the 13th of this month.—E. Sabine; Oct. 2nd, 1899.

Chrysophanus phlœas ab. schmidtii, Gerh., at Norwood.—On Sept. 24th I captured the above in a field adjoining this house. It is a fine specimen, and I shall be pleased to show it to any reader who cares to see it.—Alfred E. Harley-Mason; Thornlaw House, West Norwood, S.E., Oct. 13th, 1899.

Abundance of the Larvæ of Orgyia antiqua.—The limes in St. James's Park seem this season to have suffered severely in consequence of the large number of larvæ of *O. antiqua*. One tree in particular, near the Suspension Bridge, between Birdcage Walk and the Mall, had, when I passed it on July 31st, all its lower branches stripped. Attached to these branches, which were then putting forth new leaves, there were hundreds of cocoons well packed with ova.—F. G. Whittle; 3, Marine Avenue, Southend, Aug. 13th, 1899.

Errata.—P. 251, line 17 from top, for *T. betularia* read *T. betulæ;* line 13 from bottom, G. (not E.) Harold Conquest.

SOCIETIES.

Entomological Society of London.—*October 4th*, 1899.—Mr. G. H. Verrall, Vice-President, in the chair. The President announced the death, at the advanced age of eighty-six years, of Mr. Hippolyte Lucas, an Honorary Fellow of the Society. He gave a brief account of the career, and eulogised the work, of the distinguished French entomologist. He also announced the death of Mr. Samuel Stevens, and, in reference thereto, said the Society had to deplore the loss of one of its oldest and most highly esteemed Fellows. Mr. Stevens was formerly for many years Treasurer, and had also been a Vice-President; and during the whole period of his long connection with the Society had always shown the greatest interest in its welfare. That this interest had up to the last continued unabated was manifested by the terms of his will, in which he had made a bequest to the Society. Mr. J. J. Walker exhibited, on behalf of Mr. E. G. Bayford, a specimen of *Galerita bicolor*, Drury, a North American beetle of the family Carabidæ, said to have been taken many years ago at Doncaster; also a remarkable variety of *Vanessa urticæ*, L. (*ichnusoides*, De Selys), captured in the Isle of Sheppey on August 28th, 1899. Mr. B. A. Bower showed dark aberrations of *Boarmia rhomboidaria*, Hb., in which the normal colour of the fore wings is replaced by dark brown, causing the fuscous markings to stand out very prominently. The President exhibited a specimen of the "Spanish-fly," *Lytta vesicatoria*, taken last June near Newmarket. He remarked that this handsome beetle was now becoming very rare in England. Mr. Colbran J. Wainwright, a number of dipterous insects, including a long series of *Anthrax paniscus*, Rossi, taken in Cornwall at the end of July and beginning of August; a series of *Eumerus ornatus*, Mg., from Herefordshire, and *E. lunulatus*, Mg., from Cornwall; and a specimen of *Mallota eristaloides*, Lœw., taken near Hereford last July. Mr. H. J. Donisthorpe, specimens of *Dytiscus dimidiatus*, Berg., and *D. circumcinctus*, Ahr., taken last August in Wicken Fen; also eight specimens of *Athous rhombeus*, Oliv., including one of the black aberration, which were taken last

June in the New Forest. The Rev. F. D. Morice, three female specimens of *Exoneura libanensis*, Friese, taken at Brumana on Mount Lebanon near Beirut; and, for comparison with them, he showed two specimens of *Ceratina cucurbitina*, Rossi, from Switzerland. He commented upon the remarkable distribution of the genus *Exoneura*, Smith, this genus having been hitherto recorded only from Australia. Mr. G. J. Arrow read a paper "On Sexual Dimorphism in the Rutelid genus *Parastasia*." Mr. W. L. Distant contributed "Descriptions of four new species of Cicadidæ." Mr. Claude Fuller, a paper "On some Species of Western Australian Coccidæ."—J. J. Walker and C. J. Gahan, *Hon. Secs.*

South London Entomological and Natural History Society.—*September* 14*th*, 1899.—Mr. J. W. Tutt, F.E.S., Vice-President, in the chair. Mr. Colthrup, of Barry Road, East Dulwich, was elected a member. Mr. Montgomery exhibited two bred series of *Spilosoma mendica*, in one of which black longitudinal lines were well developed in both sexes. Mr. Colthrup, series of *Bryophila perla*, including fine yellow forms; and a series of *B. muralis* (*glandifera*), including several very pale specimens, both being from Eastbourne; together with a variety of *Spilosoma menthastri*, having a black border round all the wings. Mr. Buckstone, two males in copulation with one female at the same time, of a species of *Telephorus;* a very blue female of *Polyommatus corydon*, taken at Riddlesdown some years ago; and an example of *Chrysophanus phlœas* var. *schmidtii*, taken at Beckenham in 1886. Mr. Edwards, a long bred series of *Bombyx castrensis* from near Rochester, together with preserved larvæ, ova, and pupæ. The males showed great variation. Dr. Chapman, a sample of the species of Lepidoptera taken in August at Arolla, S. Switzerland, some 7000 feet above sea-level, including *Cupido minima*, *Erebia glacialis*, *E. mnestra*, *E. epiphron*, *E. gorge*, *Setina aurita*, &c. Mr. Adkin, large series of an *Acronycta* taken at sugar in Abbott's Wood; together with bred series of *A. psi* and *A. tridens* for comparison. Dr. Chapman could give no special character for distinguishing the two species, but considered that by the general facies the majority of the specimens were *A. tridens*. Mr. Tutt, a few bred specimens of *Porthesia chrysorrhœa*, showing traces of the black dot at the anal angle of the fore wings, the characteristic mark of *P. similis* (*auriflua*); also a pair of *Lampides bœtica*, taken at Fontainebleau, and referred to the abundance of the species in Europe during the present season.

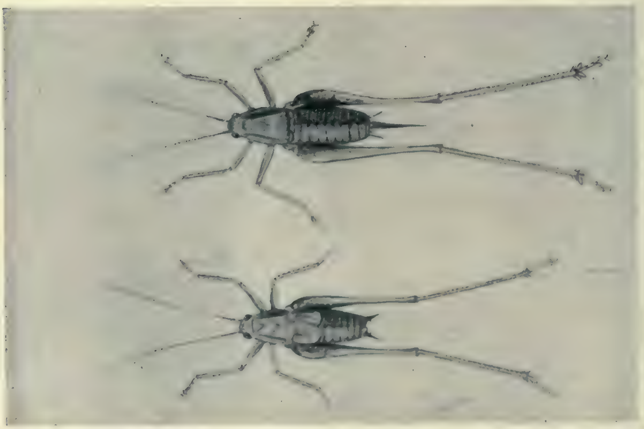
September 28*th*.—Mr. A. Harrison, F.L.S., F.E.S., President, in the chair. Mr. Dennis exhibited photographs to show the resting positions of *Mamestra persicariæ* and *Chœrocampa elpenor*. Mr. Jäger, his more important captures in S. Devon this year, including *Caradrina ambigua*, *Lithosia caniola*, *Leucania albipuncta*, and *Synia musculosa*. Mr. Harrison, long and fine varied series of *Agrotis vestigialis* (*valligera*) and *A. tritici*, taken this year at Wallasey. Mr. R. Adkin, specimens of the Lepidoptera taken at Wisley during the Society's field meeting in July. Mr. Edwards, a pupa of *Deilephila euphorbiæ*, which had changed in a frail cocoon made in a glass-topped box. Dr. Chapman recorded an emergence of the species after eighteen days in the pupa stage. Mr. Turner, a bred series of *Cabera pusaria*, showing extreme variation in the transverse lines; and a fine female variety of *Bombyx quercus* var. *callunæ*, with the basal area suffused with the male coloration, and the submarginal area semidiaphanous. It was from Carlisle. Mr. Gadge, a *Bombyx neustria* with three perfect wings, and no trace of the left fore wing. Mr. Colthrup, a larva of *Odonestis potatoria*, only about half-grown, taken in May; together with an example of *B. quercus* var. *callunæ*, in which the transverse line of the fore wing was almost straight. Mr. Lucas, series of the rare dragonfly *Sympetrum flaveolum*, and contributed notes on its occurrence. They were from Ockham Common. Mr. McArthur, specimens of *Dianthœcia carpophaga*, bred, from near Brighton, including some beautiful forms with snowy patches. Mr. Tutt, a postal-box of Heterocera he had just received from Natal, collected by Mr. Cheeseman. Mr. Harrison, specimens of the so-called jumping beans, which were seeds of a species of *Euphorbia*, tenanted by larvæ of *Carpocapsa saltitans*. The report of the Wisley field meeting was communicated by Mr. Ashdown.

October 12*th*.—Mr. A. Harrison, F.L.S., F.E.S., President, in the chair. Mr. F. Bennoch-Carr and Mr. F. M. Bennoch-Carr, of Handen Road, Lee, were elected members. Mr. Fremlin exhibited extremely interesting and varied series of Lepidoptera captured at Stornoway, including *Melanippe montanata*, *Camptogramma bilineata*, and *Eupithecia* ? sp. Mr. Montgomery, a series of *Epinephele hyperanthus*, reared from ova deposited on July 21st, 1898, and read notes on the appearance, hybernation and the variation of the species in its different stages. Mr. Adkin, two specimens of *Syrichthus malvæ* var. *taras*, taken in the neighbourhood of Abbott's Wood, with the type and intermediates. A discussion ensued as to its regular occurrence in certain localities. Mr. A. Russell, a mass of cocoons of *Eriogaster lanestris*, including composite cocoons and a portion of the larval nest, from Polegate; also a bunch of cocoons of *Saturnia pavonia* from Fleet, with a separate cocoon containing pupa; and pupa and imago of a species of Diptera. Dr. Chapman, larvæ of *Leioptilus lienigianus* in the spun-up leaves of wormwood, preparing for hybernation. Mr. Kaye, bred and captured specimens of *Pseudoterpna pruinata* from Byfleet.—Hy. J. Turner, *Hon. Report Sec.*

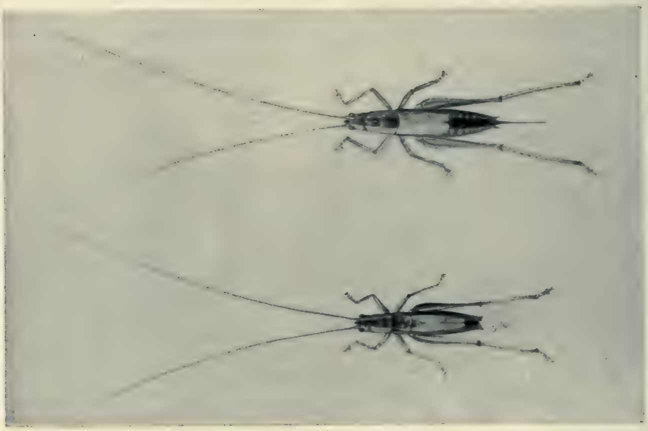
Carlisle Entomological Society.—*September* 7*th*, 1899.—Mr. James Murray in the chair. Mr. J. Wilkinson exhibited *Nomophila noctuella*, which had been very abundant at Silloth; pale varieties of *Polyommatus phlœas*, also from the same place; and larvæ of *Notodonta dromedarius*, beaten from birch, from Salkeld, near Lazonby. Mr. G. B. Routledge showed a larva of *Acherontia atropos* from the village of Castlecarrock; about a dozen others had also been found feeding on privet. Mr. J. Murray, the following Coleoptera:—*Polydrusus undatus* from Wreay, *Anthicus scoticus* from Allonby, *Rhynchites minutus* and *Rhinomaces attelaboides* from Orton, *Dichirotrichus pubescens* and *Apion ononis* from Silloth. Mr. F. H. Day also showed Coleoptera:—*Agabus femoralis*, *Calathus fuscus*, *Thyamis jacobææ*, from Silloth; *Megarthrus affinis*, *Philonthus puella*, out of fungus at Orton; *Cassida hemisphærica* swept from bilberry at Orton; also the large sawfly, *Sirex gigas*, from Carlisle, and ichneumon *Pimpla manifestator* from Orton.—G. B. Routledge.

Birmingham Entomological Society.—*September* 18*th*, 1899.—Mr. G. T. Bethune-Baker, President, in the chair. Mr. G. W. Wynn showed *Notodonta trepida*, *Dicranura bifida*, and *Cymatophora or*, bred from larvæ taken at Wyre Forest last year; also a pair of *Endromis versicolor* bred from ova found in Wyre Forest in May last year; and *Xylophasia sublustris*, taken in Hampton-in-Arden last June. Mr. J. T. Fountain, a series of *Procris statices* from Umberslade, Warwickshire, where he found a colony restricted to one corner only of a field. Mr. R. C. Bradley, a number of Thibetan Lepidoptera, obtained by a sportsman who was not an entomologist, and sent to Prof. Bridge. They were chiefly Geometers, in bad condition. It was remarked that in general facies they bore a strong resemblance to a similar lot of British Geometers, many of them being evidently closely allied to British species and perhaps identical. Mr. C. J. Wainwright, a few rare Diptera:—*Mallota eristaloides*, one specimen from Herefordshire. He said that this species was not known as British until in July 1884 Mr. F. C. Adams obtained a specimen in the New Forest. Since then Mr. Adams has taken other specimens, all however in the New Forest, and it has not been known from any other locality until this specimen was obtained in Herefordshire in July last. He also showed series of *Eumerus lunulatus* from St. Ives, Cornwall (July 26th to Aug. 7th, 1899), *E. ornatus* from Herefordshire (July 8th to 11th, 1899), and a specimen of *E. tarsalis* from the Meuse Valley, Belgium, which he said closely resembled the third British species *sabulonum*. Mr. G. H. Kenrick, four drawers containing the genus *Callidryas* from his collection, and gave an account of the genus. He said that they were amongst the insects which migrate. He came across a swarm of one species himself on the borders of the Transvaal a few years ago. They formed a stream about a mile wide, and were slowly moving on, those in the rear flying forward to the front, and that being continued. He said that they were a difficult genus to collect owing to their speed of flight: it was almost impossible to follow them, and the only way to get them was to find the flowers they frequented and wait for them. Mr. G. T. Bethune-Baker showed two drawers of Erebiæ containing some very interesting species, chiefly European, but a few being from the Pamirs and other parts of Asia; amongst other interesting species were *Sibo* from the Pamirs, *E. jordana* from Turkestan, *E. tian-shanica* from Tianshan, and *E. calmucca* also from Tianshan Mountains. Mr. R. G. B. Chase, series of *Catocala promissa*, *C. sponsa*, *Triphæna fimbria*, *Amphipyra pyramidea*, &c., taken at sugar in the New Forest in the second week in August last. Also a series of *Rhodocera rhamni* taken on heather in the New Forest at the same time; they were all in beautiful condition, but undersized. The largest seemed below the average in expanse, the smallest measured only fifty-two millimeters across from tip to tip. It was thought probable that it was owing to the dry weather and the consequent scarcity of fresh food.—Colbran J. Wainwright, *Hon. Sec.*

Obituary.—We regret to hear of the death of Dr. Alexander Wallace, of Colchester. A further notice will appear in our December issue.



1. *Thamnotrizon cinereus*, Linn. (nat. size.)



2. *Xiphidium dorsale*, Latr. (nat. size.)

W. J. Lucas del.

West, Newman photo.

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ORTHOPTERA IN 1899.

By W. J. Lucas, B.A., F.E.S.

(Plate III.)

Though the British Orthoptera number but some forty-two, yet they are so varied in form and habits, and several species are so numerous in individuals, that every naturalist must make the acquaintance of some, either at home or in his collecting excursions. Consequently a few notes on certain of the more interesting that have been met with during the past twelve months cannot be out of place now that we are nearing the close of the year—season we must not say, since some of the Orthoptera are always with us year in and year out.

Forficula lesnei has already been noticed (*ante*, pp. 16, 20, 275).

It may not be welcome news that a new locality for *Periplaneta australasiæ* has to be announced, but the fact remains that a couple were forwarded alive in February last from an orchid-house at Camberwell. This cockroach is no doubt increasing in frequency in Britain. Luckily it is rather a handsome species, and, moreover, seems to prefer warm conservatories to dwelling houses. In Kew Gardens, on Oct. 28th, a male was taken off a flower-pot standing in the *Victoria regia* tank, with the yellow markings on the pronotum reduced to a thin distal line and a basal three-pointed spot not very bright in colour.

Ectobia panzeri was taken in a new locality, amongst the sand-hills in the neighbourhood of Studland, in Dorset. The spot was quite close to the shore, a habitat which the insect evidently likes. It is plentiful, however, in the New Forest some miles from the coast. *Ectobia lapponica* was secured by sweeping in the forest at the beginning of June.

Numerous were the unsolicited visitors to the lepidopterists' treacle at the beginning of August in the New Forest, both at

Hurst Hill and at Ramnor enclosure, and amongst them occurred three of the Orthoptera. The commonest, of course, was *Forficula auricularia*; but *Meconema varium*, the silent grasshopper (!) of the oak and other forest trees, pale green in colour and most delicate in structure, was quite common too. With these were taken several females of the large brown grasshopper (*Thamnotrizon cinereus* (Plate III. fig. 1)). Ungainly creatures they look, with short stout body and hind legs, and antennæ of inordinate length. Of wings they are practically destitute, for the tiny scales possessed by the male, and still smaller points on the thorax of the female, can be of no use to them in their progress amongst the herbage and bushes. Though not often seen, they are fairly common insects in the southern part of England.

Another grasshopper, with long hind legs and antennæ, and abbreviated wings, met with on Esher Common, at Woking, and in the New Forest, was *Platycleis brachyptera*. It may generally be found hopping about on heather in rather damp situations. In some specimens the elytra are to a great extent bright green, in others grey, not an unusual form of variation with this division of the Orthoptera.

Though my note on *Mecostethus grossus* (*ante*, p. 169, and Plate II.) has not so far elicited the record of any new localities, yet it should be stated that I took it plentifully in the New Forest during the first half of August, and at three fresh bogs, making seven in all (some of them several miles apart) which have been recorded for it in the New Forest. But few females were secured. *M. grossus* varies considerably in size, and to some extent in colour, one female being very bright, with rosy dorsal surface of thorax. When handled this insect emits a dark brown-green liquid from its mouth.

But perhaps this year the most interesting species taken was *Xiphidium dorsale*. Though it does not seem to have been often noticed in this country, it probably is not uncommon; and, in order that those interested in the British Orthoptera may be assisted in making a search for it next year, a life-sized figure (Plate III. fig. 2) accompanies this note.

In size the female is about 19 mm. long, exclusive of the ovipositor, which reaches about 8 mm.; the male is smaller. In colour both sexes are delicate pale emerald-green, with a broad crimson-brown dorsal stripe along the whole length of the body —head, thorax, and abdomen. The vertex is produced as a sharp projection between the antennæ, which are very long and slender. The elytra are shorter than the abdomen, nearly hyaline, with reddish brown veins; the wings are very tiny. The ovipositor is shorter than the abdomen, rather slender, turned up slightly at the tip, but not greatly so. The cerci of the male are conical and pointed, with a distinct internal tooth.

Perhaps the most noticeable features of the insect are its rounded form and slender structure. In consequence of the latter it dries very badly, and loses its delicate colours. The abdomen should be carefully emptied of its contents, and loosely filled with cotton wool to preserve the shape.

In consequence of possessing such tiny wings *X. dorsale* cannot fly, but it hops very actively from blade to blade of the tussocks of long grass amongst which it lives, and, as it clings very tightly to them, it is not easy to secure the insect by sweeping. Perhaps the hands are the best implements with which to effect its capture, as they are certainly the readiest. If thoroughly disturbed it goes down towards the roots of the grass, and there cannot be found. When captured *X. dorsale* sometimes emits a dark purple-brown liquid from the mouth. It seems to like tussocks of a tall, soft, pale green grass, and perhaps prefers wet spots, though its habitat is not restricted to them.

Few localities have been recorded for this interesting grasshopper. Eland Shaw gives two—Herne Bay (E. Saunders) and Deal (G. T. Porritt). Mr. Porritt has also taken it at Chippenham Fen. I have myself taken a few in a very restricted spot in the New Forest (9th Aug. 1898, 12th Aug. 1899), somewhat larger numbers quite close to the coast near Christchurch, in Hampshire (Aug. 16th, 1899), and one amongst the sand-hills near Studland, in Dorset (Sept. 4th, 1899). In addition, Pagham Marsh, in Sussex, and near London, are mentioned by Burr as localities in his 'British Orthoptera.' *X. dorsale* is the only British representative of the genus.

THE LYCÆNID GENUS *AZANUS* OF MOORE.

By A. G. Butler, Ph.D.

In Marshall and De Nicéville's 'Butterflies of India' three species of *Azanus* are recognised—*A. ubaldus* (the type of the genus), *A. uranus*, and *A. gamra*.

In Aurivillius's 'Rhopalocera Æthiopica' the genus is regarded as a mere section of *Cupido*, although admitted to be "a very natural and easily recognisable group." Six species are recognised as belonging to it—*C. sigillatus*, *C. moriqua*, *C. mirza*, *C. jesous*, *C. ubaldus*, and *C. zena*.

As a matter of fact, I find the synonymy in the latter work cannot be followed, because, in the first place, *C. sigillatus* (the first species) is a synonym of *C. moriqua*; whereas *C. natalensis* is a perfectly distinct species.

In the second place, I cannot see how *C. mirza*, which is described as having the wings and fringes unicolorous and violet, can be regarded as identical with a species (apparently nearly as large again as itself), with lilac wings, brown marginal line, brownish white-tipped fringe, and three additional spots in the circle round the discoidal spot on the under surface of the secondaries. *C. jesous* (of which *C. gamra* and *C. agave* are doubtless synonyms) is also doubtless the same as *C. crameri*. *C. ubaldus* is correctly regarded by De Nicéville as the female of *C. zena*, and has nothing whatever to do with *C. crameri*, as Mr. Trimen believed.

The genus therefore will stand as follows:—

AZANUS, *Moore*.

Eyes clothed with fine short hair; first subcostal branch forming a mere short frenum, which unites the costal and subcostal veins; secondaries without tails; palpi long, porrected; antennæ moderately clubbed.

Section 1.—Front wings without thickened scaling.

1. *Azanus moriqua*, Wallgr.

Syn. *Lampides sigillata*, Butler.
Lycæna benigna, Moeschl.
Eastern Africa from Abyssinia to Zululand.

2. *Azanus mirza*, Plötz.

Cameroons.

3. *Azanus occidentalis*, Butler.

Western Africa only.

4. *Azanus jesous*, Guérin.

Syn. *Lycæna gamra*, Lederer.
Lampides agave, Walker.
Azanus crameri, Moore.
Natal to Upper Egypt; Aden, through Syria, Persia, and India, southwards to Ceylon.

5. *Azanus asialis*, De Nicéville.

Sumatra.

6. *Azanus natalensis*, Trimen.

Natal, north-eastwards through Nyasa to Wadelai. This is the largest and most conspicuous species in the genus, and differs markedly in the pattern on the under surface of the secondaries of both sexes, and in the amount of white on the upper surface of the female.

Section 2.—Front wings crossed by a thickened belt of colour in the males.

7. *Azanus uranus*, Butler.

North-western and North-eastern India, southward to Madras; also said to occur in Biluchistan.

8. *Azanus ubaldus*, Cramer.

Syn. *Papilio artemides*, Stoll.
Lycæna zena, Moore.
L. macalenga, Trimen.
L. thebana, Staud.

Natal, north-eastward to Somali and the Arusa Galla country; Arabia; North-west India, southward to the Deccan; Ceylon.

Allied to the above is a Burmese insect which appears to me to be distinct; but, as we at present only possess one male obtained at Tilin Yaw by the late Capt. Watson, I think it better to wait for further material before doing anything with it.

ON NEW *SPILOSOMA* HYBRIDS.

By Aristides v. Caradja.*

[After introductory remarks upon the scientific importance of hybridising experiments, the following new forms are described.]

Spilosoma hybr. *seileri*, Car. (pl. vi. figs. 1–6), is the offspring of *S. luctuosa*, H.-G., ♂, and *S. sordida*, Hb., ♀. The crossing was successful in five cases, but from each of the broods the larvæ hatched in quite different numerical proportions; while two broods yielded only three apiece, and the third seven, the remaining two produced forty-eight and seventy-one vigorous caterpillars, from which, however, there were reared up, excluding a number of cripples, only fifteen perfectly formed male and twenty-seven female imagines, of which six males and ten females had to be sacrificed to later experiments. At the same time I was successful with the opposite combination, viz. *sordida* ♂ and *luctuosa* ♀; but from the numerous eggs laid only small larvæ incapable of development hatched out.

A short description of *seileri* is necessary despite the figures. As regards the pattern and proportions of the wings, it is exactly intermediate between its parents. The ground colouring of the wings and other parts is grey-brown, darker than in *luctuosa*. The yellowish covering of scales always plentifully present in the last named appears but scantily in individual male and female examples along the anterior and exterior margins of the fore wings. The pair figured in Nos. 1 and 5 has the densest covering of yellow scales, and hence appears the lightest; the male figured between them, at No. 3, is the darkest specimen of the whole brood, but is nevertheless still lighter than my *sordida*, males, from the Wallis canton. Fig. 6 represents a light yellowish-grey coloured male quite divergent from both parents.

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* 'Iris,' 1898, pp. 392–7, plate vi. (Translated by G. W. Kirkaldy.) See also Entom. 1899, pp. 106–8.

If the females of *seileri* are somewhat more thinly covered with scales than the corresponding sex of *luctuosa*, they certainly have not nearly such transparent wings. The females figured at Nos. 2, 4, and 5 are altogether different from their appearance on the plate, as the spots and stripes are really almost as clearly recognisable as in the male figured at No. 1. In the whole arrangement of the wing-patterns *seileri* inclines more to *sordida*, except that all the spots and stripes are much more sharply marked, pretty nearly as in *luctuosa*. On the fore wings there are three rows of spots, proceeding from the costa at equal distances, parallel to one another, and not notably sinuately diverging, as is the case in *luctuosa;* a fourth shorter row of spots arises at the apex itself, and runs obliquely towards the outer of the three parallel rows of spots. Along the outer margin are also five more or less recognisable black spots.

The hind wings appear darker than the fore wings, and bear (as well as the distinct spot on the cell) black longitudinal stripes, which commence at the base of the wing, and end at the seven dark spots situated before the margin; the latter are placed as in *luctuosa*. On the under side of the fore wings the dark markings extend into the inner margin; on the hind wings all the spots and stripes are marked still more sharply than on the upper side. The under side of the body and the legs are light grey, the tibiæ yellowish, but not reddish yellow as in *luctuosa*.

The other examples of *seileri* vary among themselves pretty strongly, apparently, in colouring, thickness of scale-covering, and distinctness of markings; some individuals lean towards *luctuosa*, the majority more to *sordida*.

The males and females of *seileri* were quite capable of reproduction in their pairing with one another. From five copulations, all of which were fertile, one hundred and eighty eggs apiece were produced on an average; from every one of these nine hundred eggs there hatched out a sprightly caterpillar! Reciprocal crossing between *seileri* ♀ on the one side, and *sordida* ♂ or *luctuosa* ♂ on the other, also produced, in each single case, approximately normally fruitful broods, for there were scarcely 17 per cent. of the numerous eggs sterile. On the other hand, the crossings between *seileri* ♂ and *sordida* ♀ or *luctuosa* ♀ (alas! successful in two cases only) were but incompletely fruitful, for the thirteen larvæ hatched out of four broods broke down before the first skin change.

Lastly, a pairing was accomplished between *seileri* ♀ and *mendica* var. *rustica*, Hb., ♂. The result was akin to that which I have recorded from the combination of *sordida* ♀ or *luctuosa* ♀ and *rustica* ♂. The eggs were only very slightly fruitful, and, from the few that hatched only a single one managed to struggle on to pupation.

Although a pure hybrid, *seileri* has, as regards its powers of reproduction and crossing, almost the value of a species.

From these data one may conclude that both progenitors of *seileri* (viz. *sordida* and *luctuosa*), although so different superficially, are yet in reality very closely related, and must have branched off into two species themselves since a relatively short enough period. It is also likely that *sordida* is the more recent form, and that the sexual dimorphism in this species has arisen quite lately; the male *seileri* figured on fig. 6 appears to offer a very interesting illustration of a return to the earlier prevalent colouring of *sordida* ♂.

Spilosoma hybr. *beata*, Car. (pl. vi. figs. 7–9), is from a crossing between *mendica* var. *rustica* ♂ and *sordida* ♀. I described it in 'Iris,' x. p. 371.

In *beata*, *rustica*-blood prevails over that of *sordida* in the proportion of 3 : 1. The following markings, characteristic of *sordida*, have, however, been transmitted, *viz.* the somewhat elongate form of the wings, the faint yellowish grey (not milk-white) ground colour of the wings, even in the female, the tendency to a row of spots commencing at the apex, the black-spotted fringe of the fore wings, and—in the female—the noticeably dark more or less strongly impressed longitudinal stripes on the hind wings. The capital figures render a more extended description superfluous. Further crossings of this hybrid could not be effected. Upon the hybrid itself one should consult the 'Iris,' x. p. 372.

Spilosoma hybr. *hilaris*, Car. (pl. vi. figs. 10–11), has for father the hybrid *inversa*, Car.,* for mother the hybrid *viertli*, and is therefore the result of a cross between the ♂ of a race-mixing of the second order with the ♀ of a genuine bastard. As is evident from the faithful figure, the parentage of *sordida* is not very noticeable (except perhaps in the stronger spotting of the wings in the ♂); while, on the contrary, the influence of *standfussi*, in the strong darkening of *hilaris* ♂, is unmistakable. The colouring of the latter is the same as that of the lightest *standfussi* females; the ♀ resembles the *inversa* ♀ figured, only the black spots on the margin of the hind wings are much clearer marked.

This extraordinary mixture was very successful in different combinations, and rendered startling results. In the in-and-in breeding each crossing was fruitful, and almost the same in the crossing with var. *rustica* ♂.

A crossing of the hybrid ♀ with *sordida* ♂ produced eggs of which about 75 per cent. were fruitful, but of the converse only

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* Hybrid *inversa* originated from *standfussi* ♀ and var. *rustica* ♂.

16 per cent. A crossing with *luctuosa* ♀ resulted in some weakly larvæ, the converse being unfruitful.

Spilosoma hybr. *inversa*, Car., was the name I gave originally to a very rare black-and-white spotted ♂ var. of *standfussi*. Last year, however, such quantities of an insect, named *inversa* by me, the offspring of *standfussi* ♀ and *rustica* ♂, came into the market, that at present no large collection can be without it. The name *inversa* may therefore lapse for the rare form of *standfussi*, and stand for the offspring of *standfussi* ♀ and *rustica* ♂; a pair of this hybrid are shown at figs. 12 and 13.

The forms figured at 14 and 15 are from a combination of *mendica* ♂ and *inversa* ♀. This new mixture is very similar in colour to the dark form of *standfussi* which I named var. *mus.*, and I have been able to cross it further successfully with *rustica* and *inversa*.

A GUIDE TO THE STUDY OF BRITISH WATERBUGS (AQUATIC RHYNCHOTA).

By G. W. Kirkaldy.

(Continued from p. 204.)

(γ) *Gerris*, Fabr. (restricted).

= *Limnotrechus*, Stål, 1868.

In this section, the typical one of the genus, there are seven British species (one of which is, so far as our islands are concerned, restricted to Scotland), separable by the accompanying table:—

1.	Intermediate tibiæ not more than 2⅓ times (rarely more than twice) as long as the tarsi;* posterior lobe ("disk") of pronotum nearly always more or less rufescent . . .	2
—	Intermediate tibiæ rarely (if ever) less than three times as long as the tarsi; posterior lobe of pronotum not rufescent	4
2.	Abdomen longitudinally channelled beneath; submarginal flavescent line of pronotum continued on the anterior lobe	4. (?) *asper*, Fieb.
—	Abdomen longitudinally keeled beneath; submarginal flavescent line not continued on anterior lobe of pronotum	3
3.	Robust; very wide across intermediate coxæ; abdomen shallowly depressed on each side of central keel	5. *costæ*, Schäff.

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* The intermediate legs are so long that the difference between "2⅓" and "3 times" is easily recognisable.

— Less robust; narrower across intermediate coxæ; abdomen not depressed on each side of central keel . . . . 6. *thoracicus*, Schumm.

4. ♂. Sixth abdominal segment armed beneath with two strong teeth; ♀ seventh abdominal segment (first "genital") transverse, impressed beneath at base . . . 10. *odontogaster*, Zett.

— ♂ without the teeth; ♀ seventh abdominal segment not transverse 5

5. First segment of posterior tarsi more than twice as long as second; base of pronotum more angular, posterior lobe strongly keeled; species 8–13 mm. long 6

— First segment less than twice as long as the second; base of pronotum less angular, posterior lobe more feebly keeled; species 6½–7½ mm. long. . . . . 9. *argentatus*, Schumm.

6. Large species, 12–13 mm. long. Large yellow tubercle on metasternum; anterior femora black above; mesopleura very wide; submarginal flavescent line on pronotum not continued on to anterior lobe . . . 7. *gibbifer*, Schumm.

— Smaller, 8–10 mm.; no metasternal tubercle (or, if present, small and black); anterior femora pale, with two black lines; mesopleura narrower; submarginal line continued on to anterior lobe . . . . 8. *lacustris* (Linn.)

4. *G. asper* (Fieb.) ?.

= *G. thoracicus*, Flor (nec Schumm.) ?.
= *G. lateralis*, Schumm. ?.

I have not been able, up to the present, to settle the synonymy of this species. *G. asper* (Fieb.) and *G. lateralis*, Schumm., whether synonymous themselves or not, are readily separable from *G. thoracicus* and *G. costæ* by the fact that in the first two the venter is channelled (*canaliculate*), in the last two keeled (*carinate*). Of the European species with carinate venter, I seem to have two in my collection.

No. 1 represented by a single male from Pitlochry. To this species are referable three apterous females from Mr. Saunders's collection (one now in mine!). I have not seen specimens from any other country than Scotland, the records being from Pitlochry, Loch Galby, and Forres.*

No. 2 represented by a winged female from Hungary, given me by Dr. Horváth. I have seen specimens of this from Gibraltar.

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* I know the country around Forres fairly well, and I much doubt that this species was really taken there. I expect Norman included in the term "Forres" individuals taken as far afield as Granttown and other likelier places.

No. 1 seems to be a slenderer species than No. 2, and the first antennal segment much shorter in proportion to the head. The male genital segments seem different, and there are one or two minor differences. I cannot see anything in the description of *lateralis*, Schumm., really discordant with *asper*, Fieb.; but, as I do not know which of the two forms above mentioned (if, indeed, they are distinct specifically) is the true *asper* of Fieber (or the true *lateralis* of Schummel), I have left the matter in suspense until I can obtain more material. My impression is that there are two species:—

1. *G. lateralis*, Schumm., inhabiting Continental Europe (more or less locally), =*G. asper* (Fieb.) (and *G. lateralis* (Fieb.)?).

2. *Gerris*, sp. n., inhabiting subalpine Scotland very locally and rarely, =*G. asper*, Douglas, Scott, and Saunders.

Fig. 21 represents the sixth abdominal segment (from beneath), &c., of my male from Pitlochry.

5. *G. thoracicus*, Schummel.

=*G. plebejus*, Horváth.

A very common species all over England, and probably over the Scottish Lowlands. I have one or two specimens from near Inverness, but it is quite absent from the Highlands proper (being replaced by *G. costæ*), and is rare in Northern Europe. I have never seen an individual in which the rufescent (or flavescent) colour on the posterior lobe of the pronotum was not distinctly apparent.

Fig. 22 represents the apical parts of the abdomen in the male; fig. 23 those in the female (beneath).

6. *G. costæ* (Schäff.).

=*G. rufoscutellatus*, Costa (nec Latreille).
=*G. lateralis*, Puton (nec Schummel).

Very closely allied to *G. thoracicus*. Its distribution is remarkable. It is not uncommon over the greater part of Central and Southern Europe, but has not (to my knowledge) been found yet in Scandinavia. In the British Isles, on the contrary, it is a subalpine species. It has been recorded from—England, Buxton; North Wales; Ireland, Donegal and Armagh; but apparently only sparingly. In the Highlands of Scotland it is by far the commonest species; I have taken it from near Callander (in Perthshire) to Inverness, and from Loch Callater (near Braemar) to the Isle of Skye, and it has been noted also from Isle of Harris and the Orkneys. Up to this year I had taken only the melanic form, but this year, in Skye, I found colour varieties very commonly. The most extreme were—(α) bluish black (the "rufescence" on the posterior lobe "black")! (β) reddish brown on posterior lobe of pronotum, elytra, &c.; so ruddy, in fact, that I was deceived for a few moments into thinking I had obtained a supply of *G. asper*.

The characters, therefore, given by Saunders do not altogether hold good, *i.e.* "antennæ ferruginous . . . elytra black . . . legs ferruginous," &c.; the venter also is often flavous, the pale colour narrowing towards the base.

Fig. 24 represents the (male) apical parts of the abdomen (beneath).

N.B.—This species is not, as stated in the third and fourth editions of Puton's Catal. Hém. paléarct., *G. lateralis*, Schummel, that species having (as remarked previously) a canaliculate venter.

7. *G. gibbifer*, Schumm.

Common and well distributed in the South of England, but not recorded from Scotland and Ireland.

Fig. 25 represents the apical segments (male).

8. *G. lacustris* (Linn.) Stål.

=*variabilis*, Curtis.

The type of the genus, fixed by Fabricius, 1794. Distributed apparently well over the United Kingdom, but I have few precise localities. It has a great range over Europe, and I have examined a specimen from Japan which I cannot separate from the ordinary British individuals. The apical segments in the male are little different from those in *G. gibbifer*; fig. 26 represents those of the female.

The type of the species does not appear to be extant. The original description of *Cimex lacustris*, Linn., in Syst. Nat. ed. x. p. 450 (1758) is very indefinite, but excludes *rufoscutellatus*, *thoracicus*, *asper*, and *costæ*.* Poda (1761, Mus. Ins. Græc. p. 60) refers to Ray's figure (an atrocity, but it cannot well refer to anything but *lacustris* or *argentatus*). Reuter (1888, Act. Soc. Sci. Fennic. xv. p. 364 [sep.]) confidently refers Poda's description (as also that of Scopoli, Ent. Carn. 1763, p. 136) to *lacustris*, but I must confess I can see absolutely nothing distinctive about it. Houttuyn's description (1765) I have not seen, but, as Reuter refers it to *rufoscutellatus*, it need not be considered. In fact, all the descriptions up to that of Fabricius, 1794 (not the same species as that described by the latter author in 1775), are either antagonistic to the original description, or do not elucidate it; so that it may be considered as definitely fixed by Fabricius, 1794. This is fortunate, as this is the same interpretation as that held by practically all authors since the middle of this century.*

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* Linné's references to other authors, *i.e.* Ray, Bradley, &c., imply these species; but Linné says "*supra nigra*" without qualification.

9. *G. argentatus*, Schummel.

=*apicalis*, Curtis.

Very closely allied to *lacustris*. It is not common, but is probably sometimes passed by as the latter species. It is widely distributed over England, and recorded from Scotland and Ireland. The apical segments of the abdomen are not greatly different from those of *lacustris*.

10. *G. odontogaster* (Zett.).

Easily recognisable by the two strong ventral teeth in the male, and the transverse seventh segment in the female (figs. 27 and 28).

Generally distributed, though not common.

METAMORPHOSES, &c.

Little detailed information has been published on the metamorphoses of the Gerridæ. Dufour† states that the eggs are deposited one after another, but not touching nor crowded together, in a kind of mucilage fixed upon the leaves of immersed plants. They are elongate, cylindroid, not truncate at either of the extremities. Instead of opening by the unglueing and downfall of a regular operculum—as in the majority of land-bugs—their anterior third splits longitudinally, and by this rent the young nymph leaves. This occurs usually about May or June. The nymphs may be at once separated, at any stage, from the apterous imagines by the frailer frame, shorter abdomen, and by the unisegmentate anterior tarsi. They keep more to the shelter of the banks of the stream or of aquatic plants. The nymphs change into imagines usually about the beginning of August, though—as in most aquatic insects—these periods will bear a very liberal interpretation. Like the imagines, they feed on minute dead or dying flies, &c., that have fallen into the water, and are sprawling helpless on the surface.

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* I have dealt with the synonymy of *lacustris* in this manner because Reuter cites the modern acceptation, indorsed by him, as an exception to his rule.

† 1833, Mém. div. savans Acad. Sci. France, iv. p. 347.

(To be continued.)

THE LATEST ARRANGEMENT OF BRITISH PYRALIDÆ.

THE concluding part of Sir George F. Hampson's Classification of the Pyralidæ was published in February last, and we are now able to see what position the British species, referable to the family, are assigned in a system based on the neuration and other structural characters of the imago.

The six parts into which this Revision has been divided were issued as under:—

SCHŒNOBIINÆ and CRAMBINÆ (Proc. Zool. Soc. Lond. Dec. 1895).

EPIPASCHIIANÆ, ENDOTRICHINÆ, and PYRALINÆ (Trans. Ent. Soc. Lond. Dec. 1896).

CHRYSAUGINÆ (P.Z.S.L. June, 1897).

HYDROCAMPINÆ and SCOPARIANÆ (T.E.S.L. July, 1897).

PYRAUSTINÆ, pt. i. (P.Z.S.L. Nov. 1898).

PYRAUSTINÆ, pt. ii. (P.Z.S.L. Feb. 1899).

SCHŒNOBIINÆ.

There are twenty-five genera in this subfamily, the majority of which contain species belonging to Oriental and Neotropical regions only. The genera represented in Europe are *Scirpohaga*, Treits., the type of which is *prælata*, Scop. (not British); *Schœnobius*, Dup., *gigantellus*, Schiff. (type), and *forficellus*, Thunb.; *Donacaula*, Meyr., founded for the reception of *mucronella*, Schiff. (*Schœnobius mucronellus*); and *Acentropus*, Curt., in which there are but three species, including *niveus*, Olivier, the type.

CRAMBINÆ.

Thirty-one genera are comprised in this subfamily, and of these *Crambus*, Fabr. (No. 6), appears to be the largest and most extensively distributed. There are over two hundred species included in the genus, and the sequence of the species occurring in Britain is as follows:—

9. *C. paludellus*, Hübn.
33. *C. fascelinellus*, Hübn.
51. *C. inquinatellus*, Schiff.
58. *C. geniculeus*, Haw.
59. *C. contaminellus*, Hübn.
60. *C. salinellus*, Tutt.
65. *C. tristellus*, Fabr.
66. *C. selasellus*, Hübn.
70. *C. perlellus*, Scop. (*warringtonellus*, Zell., is not mentioned).
74. *C. latistrius*, Haw.
104. *C. furcatellus*, Zett.

105. *C. margaritellus*, Hübn.
109. *C. pinellus*, Linn.
111. *C. myellus*, Hübn.
119. *C. verellus*, Zinck.
120. *C. falsellus*, Schiff.
139. *C. chrysonuchellus*, Scop.
140. *C. craterellus*, Scop.
142. *C. hortuellus*, Hübn.
149. *C. culmellus*, Linn.
150. *C. dumetellus*, Hübn.
152. *C. pratellus*, Linn.
157. *C. sylvellus*, Hübn.
158. *C. ericellus*, Hübn.
(Type) 159. *C. pascuellus*, Linn.
160. *C. uliginosellus*, Zell.
161. *C. hamellus*, Thunb.

The above, with one or two trifling exceptions, is an exact reversal of Meyrick's arrangement of the British species of *Crambus*. The latter author, however, retains *Calamotropha*, Zell., for *paludella*, Hübn., but Hampson merges Zeller's genus in *Crambus*, Fabr.

Platytes, Guen. (No. 8) has thirty-eight species referred to it. The type of this genus is *P. cerusella*, Schiff., which holds the thirty-fourth place in the list; whilst the thirty-eighth species is *P. alpinella*, Hübn., generally included in *Crambus*.

The type of the genus *Eromene*, Hübn., is the European *E. bella*, Hübn., and *E. ocellea*, Haw., is the eighth species enumerated.

The sixteenth genus is *Chilo*, Zinck., with *C. phragmitellus*, Hübn., as the type, and twenty-six other species included therein.

ENDOTRICHINÆ.

Endotricha, Zell., is No. 2 of the twenty-two genera in this subfamily, and *E. flammealis*, Schiff., is placed seventh of the thirty-three species in the genus. The type is not indicated.

PYRALINÆ.

In this subfamily there are forty-eight genera; the fifth is *Aglossa*, Latr., with six species, including *A. pinguinalis*, Linn. (type), and *A. cuprealis*, Hübn. "*Pyralis*" *costalis*, Fabr., is placed, with three other species, in *Hypsopygia*, Hübn. (No. 6). *Pyralis*, Linn. (No. 7), has nineteen species, *P. farinalis*, Linn. (type), being sixth, and *P. lienigialis*, Zell., eighth. *Herculia*, Walk. (No. 16), is a more extensive genus, as it embraces some thirty-eight species, of which *H.* (*Pyralis*) *glaucinalis*, Linn., is No. 4. The forty-sixth genus in Pyralinæ is *Cledeobia*, Steph., with twelve species, of which *C. angustalis*, Schiff., ranks tenth, and is also the type.

The Chrysauginæ are entirely exotic, and the Hydrocampinæ and the Scopariansæ have been previously referred to (Entom. xxx. pp. 242, 244).

PYRAUSTINÆ.

A large subfamily, containing over one hundred and sixty genera, among which the British species are distributed as follows:—

25. *Agrotera*, Schrank. (16 species.)

11. *A. nemoralis*, Scop. Distribution: Europe; Japan; China.

70. *Sylepta*, Hübn. (122 species.)

77. *S.* (*Botys*) *ruralis*, Scop.=*verticalis*, Schiff.

74. *Glyphodes*, Guen. (142 species.)

64. *G. unionalis*, Hübn. Distribution: South Europe; Ethiopian and Oriental regions to Australia.

99. *Evergestis*, Hübn. (17 species.)

11. *E.* (*Orobena*) *extimalis*, Scop. Distribution: United States America; Europe.
12. *E.* (*O.*) *straminalis*, Hübn. Distribution: United States America; Europe.

110. *Nomophila*, Hübn. (2 species.)

(Type) 110. *N. noctuella*, Schiff. Distribution: Universal.

114. *Phlyctænodes*. (61 species.)

1. *P.* (*Spilodes*) *palealis*, Schiff. Distribution: Europe; Madeira; North Africa; Japan.
7. *P.* (*S.*) *verticalis*, Linn.=*cinctalis*, Tr. Distribution: Europe; Japan; Afghanistan; North-west Himalayas.
36. *P.* (*S.*) *sticticalis*, Linn. Distribution: Europe; Beloochistan.

116. *Diasemia*, Guen. (10 species.)

(Type) 1. *D. literata*, Scop. Distribution: Europe; Japan; India; Ceylon.
2. *D. ramburialis*, Dup. Distribution: Universal.

129. *Mecyna*, Guen. (8 species.)

(Type) 2. *M. gilvata*, Fabr.=*polygonalis*, Hübn. Distribution: Southern and Eastern Europe; Madeira; Syria; Abyssinia; Aden; India; Ceylon.

137. *Cynæda*, Hübn. (2 species.)

(Type) *C.* (*Odontia*) *dentalis*, Schiff. Distribution: Europe; Western Asia.

146. *Pionea*, Guen. (129 species.)

12. *P.* (*Botys*) *pandalis*, Hübn. Distribution: Europe; Japan.
24. *P.* (*Scopula*) *ferrugalis*, Hübn. Distribution: Europe; Western Asia; Madeira; Western and Southern Africa; Japan; Afghanistan; India; Ceylon; Burma.
47. *P.* (*Ebulea*) *crocealis*, Hübn. Distribution: Europe; Western Asia.
48. *P.* (*Scopula*) *lutealis*, Hübn.
52. *P.* (*Ebulea*) *stachydalis*, Zinck.
55. *P.* (*E.*) *verbascalis*, Schiff. Distribution: Europe; Western Asia; Japan; India; Ceylon.
(Type) 87. *P. forficalis*, Linn. Distribution: Europe; Central Asia; Japan; Himalayas.
115. *P.* (*Scopula*) *decrepidalis*, H.-S.
121. *P.* (*S.*) *olivalis*, Schiff. Distribution: Europe; Armenia.

149. *Pyrausta*, Schrank. (220 species.)

7. *P.* (*Nascia*) *cilialis*, Hübn. Distribution: Europe; Amurland.
22. *P.* (*Botys*) *fuscalis*, Schiff.
23. *P.* (*B.*) *terrealis*, Tr. Distribution: United States America; Europe; Afghanistan.
25. *P.* (*Ebulea*) *sambucalis*, Schiff.
45. *P.* (*Botys*) *repandalis*, Schiff.
57. *P.* (*B.*) *flavalis*, Schiff.
85. *P.* (*B.*) *nubilalis*, Hübn. Distribution: Europe; Western Asia; Himalayas; Assam.
101. *P.* (*B.*) *asinalis*, Hübn.
125. *P.* (*Scopula*) *alpinalis*, Schiff.
161. *P.* (*Herbula*) *cespitalis*, Schiff. Distribution: Palæarctic region: Northern India; Burma.
166. *P.* (*Rhodaria*) *sanguinalis*, Linn. Distribution: Europe; Western Asia; Siberia; North-west Himalayas.
189. *P.* (*Pyrausta*) *purpuralis*, Linn. (including *P. ostrinalis*).
190. *P.* (*P.*) *aurata*, Scop. Distribution: Europe; Syria; Persia; Afghanistan.
208. *P.* (*Ennychia*) *nigrata*, Scop.
(Type) 209. *P.* (*E.*) *cingulata*, Linn.
220. *P.* (*E.*) *octomaculata*, Linn. Distribution: Europe; Western Asia.

The Phycidæ (Phycitinæ) and Galleridæ (Gallerianæ) were revised by the late Mons. E. L. Ragonot, and these families, or subfamilies as they are now classed, will be referred to on a future occasion.

NOTES AND OBSERVATIONS.

Instinct in Chrysalis of Pararge mæra.*—On the 19th May last, in the afternoon, I collected twenty-one chrysalids of *P. mæra* from a wall near Moulins (Allier), and placed them in my caterpillar box. To minimise the inevitable shocks of transport, I covered them with a handful of fresh leaves, and carried the box as nearly as possible in one position. On my return, after a slow walk of about an hour, the box was placed on a table, and left unopened till eight o'clock the next morning. On removing the leaves, I observed that of the twenty-one chrysalids only eight were isolated; the thirteen others were associated, each one joined at the apex of the abdomen, forming four groups: two groups of two, one of three, and one of six; the last appearing like a six-rayed star. It seems indubitable that a state of repose is the natural condition of the evolutive life of a chrysalis, and we ought not to be surprised at seeing the blind power of instinct attempting to re-establish equilibrium when accidentally disturbed.

Further Notes on the Accidents caused by Bee-stings.†—(1) A man, thirty-five years old—stung by bees—was obliged to lie down for a whole day with fever (temperature, 38·4° C. = about 101° F.), loss of appetite and sleep. (2) A man, aged twenty-five—fell into a quasi-coma, and for a time lost memory. (3) Thirty-two years old—fever (40·1° C. = about 104° F.), lasting twenty-four hours. (4) Twenty-nine years old—fever (39·2° C. = about 102½° F.), loss of appetite, nausea, diarrhœa, slightly delirious. (5) Twenty-seven years old—fever (38·7° C. = about 101° F.), vomiting, loss of appetite, excessive excitement, nightmare. The venom presumably acts principally upon the nervous centres, owing to a special toxin, the existence of which is indubitable, and which is effective according to the constitution of the subject. In some neuropaths the stings cause transitory fears, which compel them to avoid bee-hives. A young man, of twenty-seven, confessed to me, some time after his restoration to health, that he dared not pass in front of a bee-hive now, and at the idea of visiting one he shivered and turned pale. I have seen him since, and he has been obliged to get rid of his hives, as he could not overcome the involuntary fear which mastered him at the sight of a bee. I propose to call this phenomenon "Apiphobia." To conclude, the following are the morbid symptoms ensuing on bee-stings: fever (often violent), inflammation of the injured part, itching, vomiting, delirium, nightmare, &c.; and, in some cases, apiphobia.

Wanted.—*Authentic* records of Gerridæ from localities outside the London district, especially the common species, viz.: *Hydrometra stagnorum*, *Gerris gibbifer*, &c. These are wanted for an early number of the 'Entomologist.'—G. W. Kirkaldy; St. Abbs, Wimbledon, Surrey.

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* G. de Rocquigny Adanson, in Bull. Soc. Ent. France, 1899. (Translated by G. W. Kirkaldy.)

† E. Spalikowski, in 'Le Naturaliste,' 1899, p. 85. (Translated by G. W. Kirkaldy.)

Anerastia lotella, *Hb.*, and Crambus latistrius, *Hw.*, etc., in the West of Scotland.—When collecting on the Ayrshire sand-hills near Irvine on July 8th, I obtained a fine specimen of *A. lotella*, Hb. This species, so far as I can make out, has never been recorded further north than Yorkshire. And, again, from almost the same locality on August 12th I secured a dozen specimens of *C. latistrius*, Haw. Meyrick in his Handbook gives the distribution of *C. latistrius* as Britain to Perth; it has not, however, been recorded from the Clydesdale district, or, in fact, the whole of the West of Scotland. The sandy coast of Ayrshire has apparently been but very poorly worked of recent years, and I am of the opinion that many species, not only among the Crambites, but in all the other groups and orders, would be turned up if a little more attention was given to that locality. It is also interesting to note that on the same day in which I took *A. lotella* I also added the bee *Colletes montanus*, Mor., to the British list of Aculeate Hymenoptera. Mr. E. Saunders, who kindly identified the species, has described it in the present number of the Ent. Mo. Mag. —And. Adie Dalglish; 21, Princes Street, Pollokshields, Glasgow, Nov. 9th, 1899.

Note on Lozopera beatricella.—The larva is similar in colour to that of *L. dilucidana* and also to that of *L. francilliana.* It is dirty white; head shining and black, with two small dots at the back of the head, also a small dot at the extreme end of the last segment. The time for the imago would be the last week in June and the first week in July. My first specimen emerged on June 23rd. In its natural state it flies very late, from about half-past seven or eight until dark, and flies very steady. There is no doubt that *L. beatricella* is a very local species, otherwise it would have been brought to light before, as it feeds on the same plant as *L. dilucidana*—*Pastinaca sativa* (the wild parsnip). As there is a striking difference between the two species, *L. beatricella* would have been easily detected if it had been bred by anyone.—W. Purdey.

[*Lozopera beatricella* was described by Lord Walsingham last year. See Ent. Mo. Mag. (2) ix. 75.—Ed.]

Smerinthus populi double-brooded.—I have for the last three years been able to obtain two distinct broods of *Smerinthus populi.* I have found ova at the end of May, and again at the end of July. This year I found a full-grown larva which pupated on July 26th. The imago appeared about August 28th, and laid a large number of eggs.—J. L. Saxby; Larkfield, Kent.

Humming Sound of Macroglossa stellatarum.—It may be from want of observation, but until this summer I was not aware that any sound was produced by *Macroglossa stellatarum.* One day, whilst attending to the plants in a little conservatory, my attention was attracted by a loud humming noise, considerably louder than that of a humble-bee, and, seeking to ascertain the cause, I found that it emanated from one of these moths, which had flown in, and which on rapidly vibrating wings and with outstretched proboscis was hovering over the flowers. I have never heard the sound out of doors, and it would be interesting to me to have the experience of others.—Joseph Anderson; Chichester.

Setting Relaxed Lepidoptera.—Being busy during the summer months, I have to set most of my insects during the autumn and winter, after having duly *relaxed* them. I am told in one of the text-books that *relaxed* insects are liable to "spring," and that it is advisable to *touch* the wings at the base with cement to *prevent* this. As my house is a new one, and therefore probably still somewhat damp, I procured a bottle of cement (from Watkins and Doncaster) with which to operate. The first thing I found was that the cement was much too thick, and that "*touching*" the base of the wings meant bringing away some of the legs, and in the more delicate insects possibly a wing. On advice I added vinegar (acetic acid) to the cement, and made it more workable. I first of all set the insects, leaving them on the boards some three weeks or more, then took them off, applied some of the cement, and strapped them down again for a night or two, or possibly a week. I am pretty expert with my fingers, and pride myself on my setting, especially on the arrangement of the antennæ. Most of my insects came off the boards looking as well as most people would desire. I then put my insects into a store-box, and wrap up in brown paper and place on top of kitchen dresser. To-day I took down some of the boxes and opened them. To my intense disgust, many of the insects looked as if they would fly out of the box, with their wings up, and their antennæ all awry! Of course they cannot be re-set. The cement seems to do more harm than good. I shall be glad if anyone will advise me what to do.—A. H. Rydon; "Awbrook," Lindfield, Sussex, Oct. 28th, 1899.

CAPTURES AND FIELD REPORTS.

Notes on Lepidoptera from the Chester District.—*V. atalanta* was unusually common in August and September. A specimen was taken at night at a Chester electric lamp. So abundant were the larvæ that I might almost say they were to be found on every clump of nettles. Small larvæ were feeding up when the butterfly was on the wing in August—surely a second brood! I do not think I ever saw so many butterflies on a given day as I did, on Aug. 10th, in the Shotwick district, at the base of the Wirral peninsula, between the estuaries of the Dee and Mersey. The landscape was fairly enlivened by them—no less than eleven species: *Pieris brassicæ, P. rapæ, P. napi, Vanessa urticæ, V. io, V. atalanta, Pararge megæra, Epinephele ianira, E. tithonus* (the latter abundant and variable), *Polyommatus phlœas*, and *Lycæna icarus* (*alexis*). In this district we came upon a marsh dried up by the excessive heat and drought, and covered with a tall and luxuriant growth of vegetation. Here we could have taken any number of the plume, *Œdematophorus lithodactylus*, a new record, I believe, for the district list. On low young sallows and poplars we found, throughout the Sealand and Shotwick neighbourhoods, from Aug. 2nd to Aug. 10th, lepidopterous eggs quite new to us. They were almost if not quite the size of the egg of *Dicranura vinula*. In every case they were attached to the under side of the leaf, sometimes singly and sometimes in batches of from two to six. They were whitish, with a pale brown apical ring, in the centre of which was a small blotch of the same tint. There was also a pale brown circular spot on one side of each egg. The eggs were rather flattish and oval. Hatching began on Aug. 10th, and all the larvæ died by the 18th. I do not think they ate anything of the sallow or poplar given to them. Here is a description taken with the aid of a strong lens:—About half an inch long. Head large, shining and black. The *general* aspect of the caterpillar is black, and rather thinly covered with greyish hairs. Each segment, dorsally, is bluish, except 3 and 4. Legs black; claspers greyish. On segment 2, on each side, is a rounded black tubercle, each tubercle emitting a tuft of black, *longer* hairs pointing forwards. Each segment is slightly raised dorsally; the 12th more so, in fact, it has a black hump. On segments 3 and 4, which are velvety black, is a large oval pale yellow spot, covering almost all the dorsal area of the two segments. Along the remaining nine segments, dorsally, stretches a line of prominent orange heart-shaped spots, each containing a small black dot. The spaces between these orange spots are whitish yellow. There is a less distinct paler orange line on each side, just above the legs and claspers, containing the black spiracles. I shall be pleased if someone will say what these caterpillars probably were. Personally, I think they might be *Dasychira fascelina* or *Orgyia gonostigma.* In North Wales, among the flowers and grasses of the carboniferous limestone, I netted, July 31st, some *L. astrarche* (*agestis*) with black discoidal spots *on all the wings*, each spot being surrounded by a white circumscription. The spots and white circumscriptions are most prominent on the upper wings. All the wings are well margined with large bright red spots, forming almost continuous bands. In the Delamere Forest district I was very pleased, on July 21st, to meet with two colonies of *L. ægon.*—J. Arkle; Chester.

Plusia moneta at Chichester.—A specimen of *P. moneta* was taken here by a lad, from a street gas-lamp, one evening in June last.—Joseph Anderson; Chichester.

Sphinges at Ringwood.—I saw a specimen of *Acherontia atropos* that had been bred here; *Sphinx convolvuli*, three examples only were seen; *Macroglossa stellatarum*, extremely abundant; larvæ of *S. ligustri*, scarce; a few larvæ of *Smerinthus ocellatus*, *S. populi* and *S. tiliæ* also, and two *Chærocampa elpenor* were taken. All the above species occur here in more or less abundance every season.—J. Hy. Fowler; Ringwood.

Note on Ligdia adustata.—I was rather surprised on opening one of my boxes to-day (Nov. 6th) to find that a fine specimen of the above had emerged. The box is kept in a cold room facing north, which is not artificially heated. I took larvæ in the middle of July, at Bexley and in August at Polegate and Hailsham, this year. I append a few dates of the capture of this species by me, which may perhaps be of interest:—1896, April 9th, 10th and 12th, Dartford Heath. 1897, June 5th to 7th, Wrotham, abundant. 1898, May 30th, Chelsfield; June 5th, Bexley; July 2nd, West Wickham. 1899, May 21st, Ranmore, Surrey; July 9th, Ranmore, Surrey; July 16th, Bexley (and larvæ); Aug. 7th, Polegate (and larvæ); Aug. 10th, Hailsham (at treacle); Nov. 6th (bred). So that I have taken the moth in April, May, June, July, and August, and bred it in November.—F. M. B. Carr; 46, Handen Road, Lee, S.E.

Acherontia atropos in Kent.—Seeing that there are several notes on *A. atropos* in this month's 'Entomologist,' I thought that perhaps the following notes from Kent might be of some use. On Aug. 25th I went to a friend's house at Hothfield, near Ashford, and in his potato-fields succeeded in digging up three pupæ. Since then nearly twenty more have been taken. I was not aware that *A. atropos* occurred in such numbers as this. An imago emerged from one of the three pupæ about Sept. 8th; the other two have died.—S. A. BLENKARN; 8, Wood Street, Cheapside, London, Nov. 10th, 1899.

COLIAS EDUSA AND C. HYALE IN 1899.—To the *Colias* records this year I can add one male *C. edusa*, near Shorncliffe Camp, on Aug. 26th last, and three *C. hyale* at the same place, on the same day. All were taken in lucerne fields. I also took one more *C. hyale* on Aug. 28th, in the same locality. — H. AINSLIE HILL; 9, Addison Mansions, Kensington, W., Nov. 7th, 1899.

SESIA MUSCIFORMIS AT SWANAGE: A CORRECTION.—In a former note (Entom. xxx. p. 111) I stated that I had taken *Sesia musciformis* at Swanage. This should have been *S. ichneumoniformis*; the former species I have never obtained there.—J. HY. FOWLER; Ringwood.

HESPERIA PANISCUS AT SWANAGE: A CORRECTION.—I cannot verify this record (Entom. xxx. p. 111), as I did not see the specimen at the time. Would the gentleman who informed me of its capture at Swanage come forward and clear up the matter? I fancy he told me that he resided in the neighbourhood of Bournemouth.—J. HY. FOWLER; Ringwood.

LEPIDOPTERA AT SWANAGE.—Whilst staying at Swanage in September, *Macroglossa stellatarum* came to a flower of scabious in my wife's dress, remaining some time, whilst it tried every little floret for honey, and even returned a second time. During my visit I saw one *Colias edusa* on the cliffs, and a male *Lycæna adonis*.—JOHN R. B. MAREFIELD; Rosehill, Cheadle, Staffordshire.

DRAGONFLIES IN THE CHESTER DISTRICT.—*Æschna grandis* has been as common and as bold as ever, especially in August. I could have taken many, but netted only one, which seemed to challenge my net by repeatedly coming well within reach. *Æ. juncea* seemed again to be scarce, probably through the shallow pools and marshes being dried up in the almost tropical sun. I saw the species only in North Wales. On July 21st I went to Oakmere to get some *Leucorrhinia dubia* for a correspondent, and my surprise was great to find the dragonfly entirely over; so were *Libellula quadrimaculata* and *Pyrrhosoma minium*. This was exceptionally early, and doubtless owing to the exceptionally hot summer. *Lestes sponsa*, however, was abundant; so were *Agrion puella*, *Enallagma cyathigerum*, and *Sympetrum scoticum*. *Ischnura elegans*, a beautiful graceful little dragonfly in black and blue, appeared in unusual numbers, as a second brood, on Aug. 4th. In North Wales, up to the end of September, I repeatedly saw a dragonfly like *Orthetrum cærulescens*, only larger perhaps, flying singly among the oak tops, but, of course, far beyond reach.—J. ARKLE; Chester.

SOCIETIES.

Entomological Society of London.—*November* 1*st*, 1899.—Mr. G. H. Verrall, President, in the chair. Mr. Arthur M. Lea, of Hobart, Tasmania; and Mr. Charles P. Loundsbury, B.Sc., of Cape Town, were elected Fellows of the Society. Mr. J. J. Walker exhibited two living specimens of *Bostrychus cornutus*, Fab., obtained from a wooden stool which was brought from Zanzibar. Mr. C. O. Waterhouse showed a living example of *Mœcha hecate*, Chev., a West African species of Longicornia. On behalf of Mr. W. Purley, of Folkestone, Mr. C. G. Barrett exhibited the following species of Lepidoptera:—*Stigmonota trauniana*, one specimen, with the costa less spotted than usual; *Lozopera beatricella*, six examples, together with the pupa-skins protruding from a stem of *Pastinaca sativa; Peronea cristana*, two examples of a very fine variety; *Cledeobia angustalis*, two deeply coloured examples; *Crambus inquinatellus* var.; *Eudorea dubitalis* var. *ingratella*, two examples; and *Endrotricha flammealis*, four examples of a dark variety. Mr. McLachlan showed four examples of *Deilephila lineata*, taken by Mr. E. W. Hainworth at Victor, Colorado, at an elevation of 9000 feet, on July 23rd, 1899; also an ash-twig which had been girdled by hornets, the observation of this curious fact having been made by Mr. W. C. Boyd, of Cheshunt, from whom he received the twig. Dr. T. A. Chapman exhibited specimens of *Erebia flavofasciata*, taken at Campolunga at an elevation of 7000 feet. He stated that the species occurred only in those places where there was an outcrop of dolomitic strata belonging to the crystalline schists, and was not to be met with elsewhere at that elevation, nor was it to be found in association with the same strata at lower levels. Mr. H. J. Elwes exhibited, and gave a brief account of, a collection of Lepidoptera made by Mrs. Nicholl and himself in a part of Bulgaria, that country which had not previously been visited by entomologists. *Lycæna eroides*, *L. anteros*, *L. zephyrus*, *Melitæa cynthia*, *Erebia gorge*, and a species which he believed to be *Cænonympha typhon*, were a few of several interesting forms to which he directed attention.—J. J. Walker and C. J. Gahan, *Hon. Secs.*

South London Entomological and Natural History Society.—*October* 26*th*, 1899.—Mr. A. Harrison, F.L.S., President, in the chair. Mr. Tomlinson, Kingston-on-Thames, was elected a member. Mr. South exhibited, on behalf of Mr. Fowler, of Ringwood, the following varieties of *Lycæna corydon:* (1) A specimen with a shining spot on each fore wing; (2) a series with the usual black hind marginal borders replaced by white quadrate spots; (3) a male with traces of orange lunules on the upper surface of the hind wings. He also exhibited a long series of *Emydia cribrum*, showing extensive variation. Mr. Harrison, a series of *Grammesia trigrammica*, including several dark varieties, approaching var. *bilinea*, from Delamere Forest. Mr. F. M. B. Carr, (1) *Dryas paphia* from the New Forest, a very fine banded *valesina* form, taken in July, 1898; (2) a dark form of the same species. Mr. Barrett, a bred series of *Cidaria truncata* (*russata*), laid by a female captured at West Wickham on June 10th. All were smoky, approaching var. *perfuscata.* Mr. Merrin communicated a paper entitled "Colour in

Nature." Mr. Claude Morley, F.E.S., communicated a paper entitled "Insects and the Balance of Nature: Elementary Notes on Ichneumons."—Hy. J. Turner, *Hon. Report Sec.*

Lancashire and Cheshire Entomological Society.—*October 9th*, 1899.—Mr. Charles Dalmer was elected a member of the Society. Mr. Pierce read a letter from Mr. J. Williams, of Vyrnwy, on the enormous number of a Dipteron which, during the past summer, infested the lake and its neighbourhood. The President's exhibit included fine melanic forms of *Hemerophila abruptaria* and *Camptogramma bilineata.* Mr. Burgess-Sopp, *Acanthocinus ædilis*, taken at Cardiff; *Phytosus nigriventris*, new to the British list, taken at Hoylake; and *P. balticus* for comparison. He also briefly noted the history of *P. nigriventris* as a recorded British species. Mr. Crabtree exhibited and remarked upon a series of Triphænas, including Scotch extreme forms of *T. orbona;* also a drawer of the genus *Tæniocampa*, including the var. *gothicina* of *T. gothica.* Mr. Day showed rarities captured in the Fen and Broad districts; and a fine lot of bred insects. Mr. Tait exhibited his Monkswood captures, and gave his experiences with *Thecla pruni* and *Apatura iris;* also a description of the district. Chief among Mr. Price's exhibits were *Erebia medea*, *Agrotis tritici*, *Heliothis marginata*, and *Rhodaria sanguinalis.* Mr. Thompson exhibited *Pericallia syringaria;* and long series of Moss captures. Mr. Pierce read a note on *Thera variata* and *T. obeliscata*, and exhibited specimens. Mr. F. Birch showed *Donacia cinerea* from Hatch Mere, and remarked upon its habits and the difficulty of collecting it. Dr. Cotton showed series of *Carsia imbutata*, *Notodonta dictæoides*, and *Celæna haworthii* from Simonswood Moss. The Rev. R. Freeman exhibited an interesting case of Norfolk insects, including the beautiful *Hylophila bicolorana* (*quercana*). Mr. Tipping, series of *Erebia medea* and *Melanthia rubiginata.* Dr. Chaster, *Pyropterus affinis* from Killarney; and other Coleoptera from Southport. Dr. Cotton said that *Acherontia atropos* had been fairly common about St. Helen's this autumn.—Fredk. Birch, *Hon. Sec.*

Kendal Entomological Society.—*October 9th*, 1899.—The President in the chair. In some opening remarks he recorded the attractiveness of sugar in the earlier part of the season, many long series of good insects having been taken up till August, but having failed to be of any use since then. As in other places, *Vanessa atalanta* and *Macroglossa stellatarum* had been exceptionally abundant. Exhibits:—Messrs. Holmes, fine series of *Thyatira batis*, *Dianthœcia carpophaga*, *Gonoptera libatrix*, *Xylophasia sublustris*, and *Acronycta menyanthidis*, a specimen of *Agrotis præcox* (an unusual inland capture), and two fine varieties—var. *schmidtii* of *Chrysophanus* (*Polyommatus*) *phlœas*, and a specimen of *Gonepteryx rhamni* with an additional orange spot on each fore wing near the outer margin. Mr. Littlewood, var. of *Noctua festiva* and black form of *Boarmia repandata.* Also fine series of *Triphæna fimbria*, *Arctia plantaginis* and *Satyrus semele* (all bred). Rev. A. M. Moss, a drawer of Geometræ, dark northern forms of *A. rumicis*, series of *A. menyanthidis* and *Epinephele hyperanthus*, from Carlisle; also a score of newly preserved larvæ. He also reported having failed to capture a specimen of *Sphinx convolvuli* flying around tobacco plants

(*Nicotiana affinis*) on Sept. 6th near Bowness. Larvæ of *Cucullia asteris* had almost all pupated by that date, but larvæ of *Drepana falcataria* and *D. lacertula* had been very abundant throughout September. Messrs. Duncan, Watson, and Wilkes also made interesting exhibits.—A. M. Moss, *Hon. Sec.*

OBITUARY.

Dr. Alexander Wallace died on October 1st, at his residence, St. John's Terrace, Colchester, aged seventy years. He was born in Guilford Street, Russell Square, London, and was educated at Winchester and Trinity College, Oxford, where he graduated M.A. Having passed through St. Bartholomew's Hospital with distinction and taken the M.D. degree, he held several appointments in London, and subsequently removed to Colchester, where for a period of about thirty years he practised as a consulting physician.

Dr. Wallace was at one time an ardent collector of British Lepidoptera, and was one of the first, if not actually the first, to take British examples of *Catephia alchymista*, *Micra parva*, *Nola centonalis*, *Caradrina exigua*, and some other rare species; and there are many notes from his pen in the older entomological magazines. He was a member of the Entomological Society of London for some twenty years, dating from 1858, and it is in the 'Transactions' of that Society that the most important of his papers on sericiculture, a subject which greatly interested him, and upon which he was an authority, are published. In the 'Entomologist's Annual' for 1869 there is a lengthy article by him on the rise and progress of silkworm culture (other than *Bombyx mori*) in Europe, with especial reference to the British introduction and acclimatization of the then new silk-producing species.

OUR INDEX.

In view of the requirements of students of the present day, it seems desirable that reference to the contents of entomological periodicals should be made as convenient as possible. The index of the volume of the 'Entomologist' for 1899 has therefore been prepared on a model different to that of any previous volume of this Journal. Instead of indexing the less common species only, as has been the custom in the past, we have now registered every species alluded to in our pages for the year, the species being entered alphabetically under proper headings.

We take this opportunity of expressing our grateful thanks to Messrs. Kirkaldy and Lucas for assisting us in this matter. The former has been good enough to undertake the Diptera, Hymenoptera, and Rhynchota; whilst the latter has kindly attended to the Neuroptera and Orthoptera.

It is to be hoped that the new departure will prove useful to our readers.

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"By mutual confidence and mutual aid
Great deeds are done and great discoveries made."

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ON A NEW GENUS OF *LYCÆNIDÆ* HITHERTO CONFOUNDED WITH *CATOCHRYSOPS*.

By A. G. Butler, Ph.D.

Whilst re-arranging the Museum collection of *Lycænidæ* of the genus *Catochrysops* (type *C. strabo*), my attention was called to the fact that, apart from the tailed or tailless character of the species, which appears in that genus only to have a specific value, many of the forms are separable from the type and its congeners by having smooth eyes, those of typical *Catochrysops* being hairy.

I am well aware that, in his recent 'Catalogue of Rhopalocera of the Ethiopian Region,' my friend Prof. Aurivillius regards *Catochrysops* and many other genera as mere sections or groups of one huge genus—*Cupido*. I fail, however, to see why characters, which in other portions of the Rhopalocera are generally regarded as of generic value—such as the absence of a vein in the primaries, the partial anastomosis of certain veins, or the absence of hair on the eyes—should be ignored in the present family. The question as to whether secondary sexual characters should be used for the separation of genera is one which does not concern the present case; personally, I see no profit in calling groups, based upon well-defined male characters, sections or subgenera; it appears to me to be far better to regard them as genera. But to refuse constant structural characters common to both sexes and accompanied by even slight differences of form or pattern, seems to me to be unscientific and retrograde.

Euchrysops, gen. nov.

Primaries somewhat less acuminate than in *Catochrysops;* secondaries invariably tailed, with similarly placed ocelloid spots sprinkled with metallic scales towards anal angle on under surface; eyes quite smooth instead of hairy. Type, *E. cnejus.*

Of the species at present in the Museum collection, the following should be placed in Euchrysops:—

E. cnejus = *E. theseus* = *E. hapalina*, *E. contracta*, *E. ella*, *E. pandava* (of which *E. nicola* seems to be an intermediate form), *E. trifracta*, *E. cyclopteris*, *E. naidina*, *E. lochias*, *E. hippocrates*, *E. lois.*

Wallengren's beautiful little species, which I have recently quoted as "*Catochrysops mahallokoæna*," has smooth eyes, but may at once be separated from *Euchrysops* by the close approximation of first subcostal branch and costal nervure (veins 11 and 12), and lack of tails to hind wings; it is nearly related to *Chilades trochilus.* In *Neolycæna*, which has smooth eyes, the third subcostal branch (vein 9) is wholly absent, so that the vein is trifurcate.

THE ORTHOPTEROUS FAUNA OF THE BRITISH ISLES, BELGIUM AND HOLLAND.

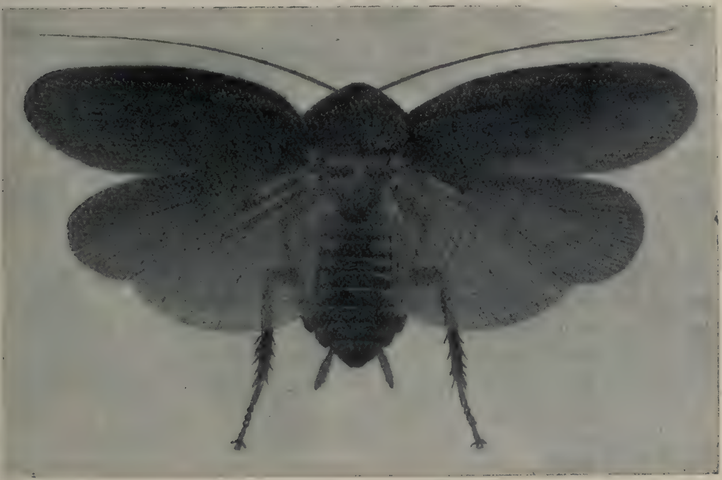
By W. J. Lucas, B.A., F.E.S.

In the 'Annales de la Société Entomologique de Belgique,' October, 1899, appears an article by the veteran Belgian entomologist, M. le baron Ed. de Selys-Longchamps, comparing the orthopterous fauna of the British Isles, Belgium, and Holland. A summary of the results arrived at, together with a few notes that seem to be called for in connection with some of the British species, cannot but be of interest to orthopterists in this country also.

Of the **Forficulidæ**, six species—*Labidura riparia*, *Anisolabis maritima*, *A. annulipes*, *Forficula lesnei*, *Apterygida arachidis*, and *Chelisoches morio*—are British, or have occurred in Britain, but do not appear to have been observed in Belgium or Holland. *Labia minor*, *Forficula auricularia*, and *Apterygida albipennis* are common to the three countries; while *Chelidura acanthopygia* occurs in Belgium and Holland, but has not been recorded as British.

> Of these nine species set down as British, *L. riparia*, *A. maritima*, and *A. albipennis* have not been taken for some years; *A. annulipes* and *A. arachidis*, although they certainly breed here, do so only under artificial conditions as regards temperature; of *C. morio* but two specimens have occurred—a pair which came to Kew in sugar-cane from Mauritius in August, 1894 (*ante*, vol. xxxi. p. 50).

Six species of **Blattidæ** are found in all three countries. These are *Ectobia lapponica*, *E. livida*, *E. panzeri* (*ericetorum*), *Blatta americana*, *B. orientalis*, and *Phyllodromia germanica*. *B. australasiæ* is now well known in Britain; it has been recorded from Belgium, but it does not appear in the Dutch list. In addition to these, *Rhyparobia maderæ*, *Leucophæa surinamensis*, *Blabera gigantea*, and *Nyctibora holosericea* have been accidentally introduced with more or less frequency into Britain, but have not been noticed in Belgium or Holland.



NYCTIBORA HOLOSERICEA.

Eleven species are in this family set down as British, of which the three Ectobias only are indigenous. The three Blattas and *Phyllodromia germanica* breed here profusely where they are established, but require warmth. It is just possible that *L. surinamensis* breeds, or has bred, in Kew Gardens. The others are merely "casual visitors" due to foreign trade. Of the last, *N. holosericea* has been but once noticed; the single specimen was taken at Covent Garden, and sent to Messrs. Watkins and Doncaster, July 6th, 1897. They sent it alive to Mr. Burr, who wishes me to record it. It is a large insect, measuring 90 mm. in expanse of wings, of a fairly uniform rich dark chestnut colour, except the wings, which are to a great extent transparent; the flat dorsal surface of the abdomen is very dark, with much lighter irregular margins. The pronotum and elytra are covered with a fine yellowish pubescence, which in some positions gives them the appearance of emitting a faint phosphorescent light. [Fig. 1. The tarsi of hind legs, cerci, and antennæ are restored.]

None of the **Mantidæ** are native in either country, though *Mantis religiosa* has occurred accidentally in Belgium.

In all three countries there occur of the **Acridiidæ**, *Mecostethus grossus*, *Stenobothrus viridulus*, *S. rufipes*, *S. bicolor*, *S. elegans*, *Gomphocerus maculatus*, *Œdipoda cærulescens* (only as a very casual visitor in Britain), *Tettix bipunctatus*, and *T. subulatus*, while *Pachytylus migratorius* is a casual visitor to each. *Stenobothrus lineatus*, *S. parallelus*, and *Gomphocerus rufus* are common to Britain and Belgium; while *Stenobothrus biguttulus*, *Pachytylus danicus* (*cinerascens*), and *Psophus stridulus* are common to Belgium and Holland. *Gomphocerus sibiricus*, *Acridium ægypticum* (*tartaricum*), and *Schistocerca peregrina* have occurred casually in Britain alone; *Stenobothrus stigmaticus*, *S. hæmorrhoidalis*, *S. vagans*, and *S. dorsatus* are found in Belgium only; Holland possesses none that are peculiar to itself.

> One specimen only of *Gomphocerus sibiricus* was captured some years since "on the hills at Netley"; it is difficult to imagine how a single specimen could have got there.

Of the fifteen **Locustidæ** enumerated by De Selys-Longchamps, *Leptophyes punctatissima*, *Meconema varium*, *Xiphidium dorsale*, *Locusta viridissima*, *Platycleis grisea*, *P. brachyptera*, and *Decticus verrucivorus* are found in all three countries. *Thamnotrizon cinereus* and *Platycleis rœselii* are found in Britain and Belgium; *Ephippigera vitium* occurs in Belgium and Holland. *Barbitistes serricauda*, *Gampsocleis glabra*, and *Platycleis bicolor* are peculiar to Belgium; while *Phaneroptera falcata* has occurred casually once and *Decticus albifrons* very rarely, in Britain alone.

Four species of the **Gryllidæ**—*Nemobius sylvestris*, *Gryllus campestris*, *G. domesticus*, and *Gryllotalpa vulgaris*—occur in all three countries. *Gryllus capensis* is found in Holland only, while *G. bimaculatus*, *G. brunneri*, and *Gryllotalpa didactyla* are casuals in Belgium alone.

To sum up as far as Britain is concerned, there are twenty-nine (or twenty-eight if *Decticus verrucivorus* is omitted) Orthoptera that appear to be natives;* seven (two earwigs, with but a slight foothold, four cockroaches, and the common cricket), which breed here in warm houses; three earwigs that are more or less historic; the rest are casuals. These last might no doubt be added to considerably. Burr states that some species of the *Conocephalides*, especially of the genera *Copiophora* and *Conocephalus*, have been taken in London. A specimen of *Phaneroptera privata* has been found at Merton Hall, in Norfolk. I have in my own possession five Orthoptera from Kew Gardens not included in the list. One of them is probably *Copiophora brevirostris*; the others are not yet identified, but the presence of all is of a most casual nature.

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* Burr considers *D. verrucivorus*, *A. albipennis*, and *L. riparia* to be indigenous.

ENTOMOLOGY IN NEW ZEALAND.

By Ambrose Quail, F.E.S.

I arrived in this colony three years ago from London, and soon found that entomologists were scarce and scattered; in consequence I had to depend on my own resources for prosecuting entomological study, there being little or no literary work—at least get-at-able. When one is thus thrown upon his own knowledge, with an entirely unknown fauna to deal with, it is surprising what little headway can be made.

Again, locality is an important factor. In this respect I have been unfortunate. First, in Auckland the district is volcanic and comparatively sterile, hence a dearth of Insecta; next, I became located in an inland town, wherefrom it is almost impossible to get away for collecting purposes, the district being more or less under cultivation, all bush having been burnt off—the usual plan. Doubtless bush land would be an "El Dorado" to an entomologist.

Recently I discovered that Professor F. W. Hutton is the author of descriptive catalogues of New Zealand Diptera, Hymenoptera, Orthoptera, and Neuroptera; and, of course, the late W. M. Maskell's special work on the Coccidæ (Homoptera) has a world-wide reputation, and is of scientific importance. E. Meyrick seems to have been the most prominent writer on the Lepidoptera, his work being scattered amongst scientific publications; and G. V. Hudson, already the author of an elementary text-book on New Zealand entomology, has, during the last few months, published a work on the "Macro"-Lepidoptera of New Zealand, based upon the scattered work of Meyrick.

Under these circumstances, one can realize what Stainton has done for British lepidopterists. Cavil as we may at Newman, they both popularized the study of Lepidoptera in England, and laid the foundation stones upon which the present generation has raised, at any rate, this branch of entomology to the level of botany, and the rank of a science. From this point of view great credit is due to a "pioneer" author, and G. V. Hudson's work will be a useful volume to local entomologists, though it does not rank with the high-class scientific work of many recent writers—Scudder, Packard, Dyar, Comstock, Chapman, Hampson, Tutt, and others—with which the writer seems to be unacquainted. In the following notes I propose to make comments, which may induce the author to pay more attention to contemporary literature, and place less dependence upon the work of one man, and that man not himself, in any further publication he undertakes.

Among the first Lepidoptera taken by myself was a specimen of *Sphinx convolvuli* in Auckland, February, 1897. This species is the only representative of the Sphingidæ in New Zealand. Considering that February is summer in this part of the world, and winter in England, the distribution of such a species is an interesting subject. Judging from Hudson's figure (plate xiii.), in respect to markings and colour, one might assume it a local race due to extreme of distribution; my Auckland specimen, however, differs in no respect as to colour and markings from European and Australian *S. convolvuli*, proving this is not so (the species is well figured in Kirby's "European"); and though I am well acquainted with the species, I cannot remember ever having seen any example like that figure of Hudson's, which, if like the insect it represents, is not typical, but a rare variety. I am inclined to doubt the figure. Another interesting species, *Cosmodes elegans*, is obtained in Auckland, which differs in no respect, so far as my memory serves me, from a series of this species which my friend Culpin sent to me some years ago from Queensland, having confluent pale green markings finely edged with silvery, and towards the outer margin of fore wings a broken pinkish brown bar edged both sides with silvery, two white dots on costa towards apex, and ground colour bright brown. On plate vi. Hudson's figure has some circular and elongated dull green spots, with curved lines in place of the bar. Only one species of *Plusia* is stated to occur. I have an Auckland specimen which certainly does not agree with Hudson's figure (plate vi.) of *Plusia chalcites*, which looks like an overgrown *P. gamma;* mine has the metallic spots exactly as those of *P. iota*, but the ground colour of the fore wings is as dark as *P. gamma*, with metallic lines near the base, and the hind wings are very like in colour to *P. chrysitis*. *Agrotis ypsilon* occurs commonly in New Zealand, being amongst the largest of the Noctuæ; the largest species in this group being *Dasypodia selenophora*, nearly the size of *Mania maura*. I felt the excitement of the old *M. maura* days when I saw this insect at my sugars. Hudson's figures of the Caradrinina (Noctuæ) are very poor; the Notodontina (Geometræ) are well figured; and the Papilionina (Rhopalocera) are perhaps the best in the book. Alas! the old landmarks—Noctuæ, Geometræ, Rhopalocera—are no more; and the old familiar genus *Mamestra* becomes *Melanchra* (*à la* Meyrick). Entomological nomenclature is like the sand at the seaside, shifting at every tide. Referring to sugar, I may mention I had good success last season, until the grass began to flower; then I gave it up, as Lepidoptera were conspicuously absent; also I notice that warm, rainy evenings are good for collecting at light; at such times, mostly small fry; but among them several species of Hepialidæ—and curiously of the latter all females in the genus *Porina*—come in dozens. I have the same report from South Africa in regard to light.

Reverting to my subject. When in Sydney, N.S.W., a species of *Nyctemera* was very plentiful, and, as I received a lengthy series from my friend Culpin, evidently extends through to Queensland. In New Zealand we have a species of *Nyctemera* which, so far as I can see, differs in no respect from the species I took in Sydney, and received from Queensland, There is, of course, a certain amount of variation *inter se;* I therefore believe there is only the one species, but should be glad to co-operate with any Australian entomologist in describing the whole life-history of the Australian and the New Zealand representatives. Curiously Hudson gives the name *N. annulata* (Boisd.), with *N. doubledayi* (Walk.), as a synonym; Kirby gives *N. annulata* (Boisd.) as the name of the Australian species, and mentions that a very similar species, *N. doubledayi*, occurs in New Zealand ('Text Book,' 1885). This supports my belief for sinking the one name as a synonym of the other. Hudson identifies the New Zealand *Nyctemera* with the Australian, though he says, "this moth is confined to New Zealand, but two closely allied species . . . are found in Australia." The insect has black wings with white band, sometimes broken on fore wings, and a white circular spot on hind wings; the thorax marked with yellow and brown; male and female both with pectinated antennæ, male more conspicuously so. Also a comparison of lengthy series of the New Zealand species of the genus *Metacrias*, with certain Australian *Spilosoma*(?), will reveal duplication of species. My study of the neuration always led me to believe Arctiadæ to be somewhere about the lower Noctuæ in phylogeny, with Bombycid affinities (structural characters); but on what logical grounds Hudson can assign to the Arctid group (*Nyctemera*) the position of specialized Noctuæ, I cannot conceive; in placing them as the first genus in the Caradrinina, he gives them the position of the most specialized (recent) of that division.

Anosia erippus and *A. bolina* (both excellently figured by Hudson) are also Queensland species. *Vanessa cardui* I have not yet met with, but the blue-centered black spots of hind wings show kinship with the Australian *V. cardui*, as the European specimens are without the blue centres; this has, I believe, been pointed out by Anderson in his 'Victorian Butterflies.' I soon, however, met with the common and very handsome *V. gonerilla*, which differs from the European *V. atalanta* in the band of the fore wings being smaller, and the band of the hind wings more central and not bordering the fringe as it does in *V. atalanta;* the colour of these bands is also more vivid. I never found the larvæ of *V. gonerilla*, but it is interesting to learn that the habits approximate closely to *V. atalanta*. It feeds on shrub and tree-nettles, concealed under a tent of leaves, and pupates in the tent. I have often collected larvæ of *V. atalanta* in England, and cannot help remarking upon the habits of these species being so close, though the localities are so far apart. *Chrysophanus salustius* is a common species, about the size of *C. virgauræ*, and not greatly dissimilar; but the male has spots on the upper side; it has the flitting flight so familiar in *C. phlœas*.

Here I would enter a protest against commencing a book with specialized groups (most recent), and finishing with the most generalized groups (most ancient). Mathematics advance from simple calculation to complex problems; chemistry from simple principles to analysis: why not zoology from generalized to specialized organisms, the latter admittedly having evolved from organisms similar to the former? The result in Hudson's work is that we turn from the Rhopalocera (Papilionina) to the Micropterygina: from one of the most specialized divisions of the Lepidoptera to the most generalized. We read: "The Micropterygina are the ancestral group of Lepidoptera, from which all others have descended." This is rather rich, considering the present state of our knowledge of the groups of smaller Lepidoptera, and the fact that the Micropterygina (including Hepialidæ!) alone possess the jugum, this statement is without parallel in science. That Frenatæ and Jugatæ were derived from Trichoptera is undoubtedly true, but the one from the other I do not think can even be assumed upon any existing knowledge of structure in the Lepidoptera.

The home of the Hepialidæ is, I think, the Australasian region; my lists show twenty-nine species—possibly thirty-one species—already described in Australia, and nine species described in New Zealand—a total of possibly forty species, against eight species in Europe, of which five are British. The great interest attaching to this group of the Lepidoptera requires very special treatment of the descriptions of all stages; unfortunately, Hudson's figures of the Porinas (plate xiii.), with which I am acquainted, are bad; so much so, that a correspondent wrote, asking me whether the North Island forms differ from the South Island forms of certain species, as he was unable to recognize the species (by the figures) with Southern forms which he collected. I possess good series of four species—*Porina umbraculata*, *signata*, *despecta*, *cervinata*, from North and South, and cannot observe any local variation; they are, in fact, remarkably constant, except *P. cervinata*, which is most variable, and I have one from the South very black in ground colour, offering almost a parallel with the var. *hethlandica* of *Hepialus humuli*. The figures of imagos, male and female, of *Hepialus virescens* (plate xiii.), are excellent; this is one of the handsomest of the Hepialidæ with which I am acquainted, the only species in the genus, and the largest of the group in New Zealand. Hudson figures the adult larva (plate iii.), and places the position of the spiracles correctly, although he does not indicate the position of the tubercles; this is not easy to do with this species, owing to the tubercles being scarcely distinguishable upon the segments. The position of the tubercles on the abdominal segments is—anterior trapezoidals on large swollen areas of the principal subsegment, dorsal, close together, with one hair each; posterior trapezoidals small and remote on the posterior edge of the next subsegment, with one hair each; spiracle two-thirds down from median line (dorsal) on the intersegmental membrane of anterior edge of principal subsegment; above spiracle, slightly posterior, is a tubercle bearing one long, one short, hairs (supra-spiracular); immediately posterior to the spiracle are two small tubercles, each with one hair; below spiracle is a large tubercle with one anterior hair; prolegs have four hairs at base; and one hair on inner side of prolegs. Hudson gives no hint as to the time occupied in its transformations, but I found half-grown larva at the time this species is in pupa (September), proving at least two years from ovum to imago. *Porina* larvæ which I have examined agree with *Hepialus virescens* in the number of hairs on tubercles and prolegs, but the spiracles are moved to the central area of segments, and consequently the position of the tubercles does not correspond with the latter. I hope to give details of the structural characters of all stages of New Zealand Hepialidæ at a later date. In the letterpress we observe the following:—"The larvæ always consist of thirteen segments, number one being the head." We find this is almost a repetition of Kirby's words ("European"), and is an error which very little use of the microscope would reveal. As a matter of fact, lepidopterous larvæ consist of fourteen segments. Again, "usually segments 7 to 9 and 13, each have—fleshy—prolegs." What about 10 (technically 6th abdominal)?; and 13 should be 14. Moreover, the author is not consistent, for we read—*Hepialus virescens* larva—"The head is large, dark brown, very irregularly striated, and covered with a few short bristles. The first segment is hard and shining," meaning thereby the 1st thoracic, otherwise the prothorax, or, consistently, the second segment. Errors in colour may be the lithographer's, but errors in letterpress must be the author's, and by a man's writings so we must judge his capacity as a student.

Palmerston North, New Zealand.

NOTES AND OBSERVATIONS.

Scottish Rhynchota.—The following captures of Scottish Rhynchota, now—through the kindness of the captors—in my collection, appear worthy of record:—(α) *Acanthosoma dentatum* (De Geer), Saund., *A. interstinctum* (Linn.), Saund., and *Orthotylus marginalis*, Reut., Saund.—all from Ethie Burn, Black Isle, South Sutor of Cromarty, Sept. 20th, 1899, Mr. W. R. Ogilvie-Grant; and (β) *Dolycoris* (*Pentatoma*) *baccarum* (Linn.),* on *Achillea millefolia*, at Kinnoull Hill, Perth, Sept. 21st, 1899, Mr. T. M. McGregor.—G. W. Kirkaldy.

Synonymy: Rhynchota.—

1. *Mindura hemerobii* (Walker), Melichar, is a *Sassula*.
2. *Corixa lateralis*, Leach, 1818 = *hieroglyphica*, Dufour, 1833.
3. *Notonecta templetonii*, Kirby, 1891, is an *Enithares*.
4. *Notonecta triangularis*, Guérin, 1830-4, is an *Enithares*, and = *Notonecta simplex*, Kirby, 1891.
5. *Enithares indica* (Fabr.), Stal = *Notonecta abbreviata*, Kirby, 1891.
6. *Enithares brasiliensis*, Spin., 1837 = *Bothronotus grandis*, Fieber, 1851.
7. *Notonecta indica*, Linn., 1771 = *americana*, Fabr., 1775 = *unifasciata*, Guérin, 1858.—G. W. Kirkaldy.

Rhynchota of Perthshire.—In the 'Transactions' of the Perthshire Society of Natural Science (vol. iii. pt. i. 1898–1899) there is a list of the Rhynchota known to occur in Perthshire; this has been compiled by Messrs. McGregor and Kirkaldy. Altogether some fifty-two species belonging to the nine families considered are enumerated, and of these six are recorded from Perthshire for the first time, two of the latter being new to Scotland. The authors are of opinion that this total does not adequately represent the Rhynchota fauna of Perthshire, as some of the most promising localities in the county have so far not been explored. The remaining families will be treated in a second paper, which it is proposed to publish at an early date.

Odonestis potatoria Larva hybernating through Two Winters.—In May last I took a number of half-grown larvæ of *O. potatoria* at Chichester, which had already hybernated through one winter. One or two died; the others fed up and duly pupated, and the imagines emerged with the exception of one caterpillar, which fed very slowly, and since Sept. 28th has eaten nothing, and is now hybernating a second time. Is not this unusual?—C. W. Colthrup; 127, Barry Road, East Dulwich, S.E.

Plusia festucæ with confluent Spots.—Among twenty to thirty specimens that I bred this season from collected pupæ (second brood), there is one with the gold spots confluent on the right fore wing. On the left fore wing the spots are separated by the thinnest possible line. The pupæ were all taken within a couple of miles from Chester.—J. Arkle; Chester.

Note on Ligdia adustata.—Following up Mr. Carr's interesting note (Entom. xxxii. 308), I may say that *Ligdia adustata* has always struck me as being a somewhat erratic species, and one which the collector may reasonably hope to come across at almost any time during the summer months. I can add some later dates than Mr. Carr's for specimens taken at large, namely, Aug. 24th and Sept. 10th, 1891 (in the Isle of Wight), and I believe some others quite at the end of August a year or two previous. On the other hand, I have no earlier date than April 25th, and that was in 1893; but, as I do very little field-work in April, this is not altogether surprising. I have bred the species (without forcing) from March 25th onwards, but certainly had no late autumn emergences.—LOUIS B. PROUT; 246, Richmond Road, N.E., Dec. 7th, 1899.

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* This species has been taken in the same place previously on *Hesperis* and *Verbascum* (see Trans. Perth. Soc. Nat. Sci. 1899, iii. p. 2).

GREAT DESTRUCTION OF INJURIOUS BEETLES.—While recently on a visit to Alford House, near Springburn Bush, twenty-five miles from Ashburton, I was informed by Mr. Herring of the prodigious destruction of two indigenous species of *Odontria* (*zealandica* and *striatum*), both of which are very injurious to vegetation, especially grasses. The larvæ are both root-feeders, and commit serious havoc in paddocks sown down in English grasses. The perfect beetles appear in the months of November and December, and swarm in myriads on calm sultry evenings; they settle in the grass to deposit their eggs, which hatch in a fortnight, and the larvæ burrow into the ground to commence their depredations. On Dec. 16th, 1897, a north-west gale of wind of exceptional severity blew on the upper parts of the Canterbury Plains near the ranges. Although it was felt at Ashburton, no damage was done to property excepting to cover everything in the houses with very fine dust. Through the day the sun was obscured lower down the Plains by the dense clouds of dust which the strong wind had scoured off the newly-sown paddocks near the ranges. Close to the latter are considerable areas of tussock-grass (*Poa australis*), in which the *Odontria* or cockchafer beetles shelter during the day. On part of Mr. Herring's property, two and a half miles from the base of the ranges, a gorse fence grew at a right angle with the wind. At one end of the fence, where a five-foot gate is placed, the wind during the gale had produced an eddy. Here the soil and the myriads of dead bodies of the brown beetles were deposited in a drift to the depth of two and a half feet. The soil-drift to the same depth was deposited the whole length of the gorse fence, extending about a mile. The fierce low-blowing wind leeching through the tussocks had blown the beetles out, and, carrying their shattered bodies along with the soil scoured off the freshly-sown fields, deposited both together on the low side of the fence. Parallel with the gorse fence, but a chain from it, there is a belt of mixed pines, which also, at the present time, show the effects of the wind-driven soil beating against them two years ago.—W. W. SMITH; Ashburton, N.Z., Sept. 25th, 1899.

ORTHOPTERA LOCALITIES.—Mr. C. W. Dale, in reference to note in 'Entomologist' (vol. xxxii. 289), tells me that *Ectobia panzeri* occurs on the Chesil Beach, and at Glanvilles Wootton, in Dorset, as well as at Studland. He has also found *Xiphidium dorsale* commonly near Studland, and in the marshes between Freshwater and Yarmouth, in the Isle of Wight; and *Platycleis brachyptera* common at Bournemouth, and on the Purbeck heaths. He further states that *Leptophyes* *punctatissima* and *Meconema varium* occur at Glanvilles Wootton late in November; the former, indeed, has been noticed as late as Dec. 5th.—W. J. Lucas.

Emergence of Clostera reclusa.—A few larvæ of various sizes of the above were taken from dwarf sallow in Wicken Fen in the third week of June, 1899; also four larvæ from Oxshott, nearly full-grown, on July 20th. The following are the dates of emergence from pupæ kept in a cold north room without a fire:—July 11th, one female; 13th, one female. Sept. 8th, one male; 16th, one male. Nov. 30th, one male. Dec. 7th, one female. With regard to the last three, I am unable to say whether they came from the June or July larvæ; but in any case the last two dates seem very extraordinary even for bred specimens.—F. M. B. Carr; Dec. 12th, 1899.

Abnormal Emergence of Smerinthus populi, &c.—Referring to Mr. Cardinall's note on *S. populi* (*ante*, p. 284): It does not appear unusual for individuals of this species to emerge from the same year's pupæ. I have had similar experience with this, as well as *S. ocellatus*, in past seasons. This year I reared an early brood of the larvæ of the latter species, which had all attained the pupa state by the end of July. One imago emerged on Aug. 19th; the remainder are still in the pupa state.—R. Laddiman; 25, Drayton Road, Norwich, Nov. 23rd, 1899.

Mould in Relaxing Boxes.—I think relaxing may be at least one cause of mould appearing on insects in the cabinet, since spores may become attached to the insects in a mouldy box, and these spores may lie dormant and only develop into mould a long time afterwards, even though there be no appearance of mould itself on the insect when set and taken off the boards. Boxes may be effectually preserved from becoming mouldy by taking the following precautions:—To half a pint of water boiling in a saucepan add a tablespoonful of Calvert's No. 5 carbolic acid. Let the mixture boil for two or three minutes, and then pour it into the box. Let it stand till cold, then pour off and drain the box thoroughly. Leave it open until surface appears thoroughly dry. It will then be in a sufficiently moist state to keep insects relaxed, and they will keep sweet and fit to set in it for at least two or three weeks. —F. C. Woodforde; Market Drayton, Salop.

Relaxing Lepidoptera.—A year or two ago one of my friends told me of a method of relaxing insects by applying rectified spirits of naphtha to the thorax, antennæ, and legs of the specimens, and in a few minutes they were ready for setting. This I tried, but the drawback of the method proved to be that the naphtha had a strong tendency to run up the wings, and in many cases spoil the appearance of the insect; but it suggested another mode of using naphtha that I have since tried with success, and particulars of which I now give for the benefit of Mr. Rydon and other readers. Make an ordinary tin box into a relaxing box by lining with cork, and put two or three narrow strips of cork down the longest length to elevate the insect when pinned in. When about to use pour in hot water to saturate the cork, and, after throwing out the water, put a few drops of carbolic acid on to keep mould down. Now add sufficient naphtha to run over the cork without waste, pin in the insects, and the most perfect relaxing box will be the result. Geometers are ready for setting next morning if put in the night before; Noctuæ not more than twenty-four hours. Repeat the process every time of using.—J. Beauland. [See Entom. xxviii. 56.—Ed.]

CAPTURES AND FIELD REPORTS.

Vanessa atalanta and V. io abundant at Sudbury, Suffolk, in 1899.—During the past season *V. atalanta* was very abundant here. It was on the wing as late as October 29th. The larvæ of *V. io* were also exceedingly plentiful here in July; in some places the nettles were quite black with them, for they simply swarmed. They pupated about July 21st, and the butterflies emerged about August 3rd. As a rule, *V. io* is not common with us.—Edward Ransom; Sudbury, Suffolk, Nov. 16th, 1899.

Abundance of Vanessa atalanta in 1899.—This lovely butterfly has been unusually plentiful here during the past season. I captured a number in my garden during the latter half of August. The flowers of the garden scabious proved the chief attraction, and they were easily netted while engaged in imbibing the nectar from these flowers. All those I saw and captured were rather under the average in size. It would be interesting to know if this fact has been noted elsewhere.—R. Laddiman; 25, Drayton Road, Norwich, Nov. 23rd, 1899.

Acherontia atropos in 1899.—Since my note (xxxii. p. 255) on the appearance of *A. atropos* in Suffolk, three pupæ have been found here and imagines emerged therefrom about the middle of October. I have also seen a pupa which was found at Long Melford, Suffolk.—Edward Ransom; Sudbury, Suffolk, Nov. 16th, 1899.

On Oct. 7th a female specimen of *A. atropos* emerged from pupa, and another example on the 18th of the same month. Both were perfect; they were reared from caterpillars taken at Dover. — C. W. Colthrup; 127, Barry Road, East Dulwich, S.E.

On Sept. 22nd a full-fed larva of *A. atropos* was brought to me which was found crawling on a road near this city. This is now in the pupa state.—R. Laddiman; 25, Drayton Road, Norwich, Nov. 20th, 1899.

Catocala nupta in 1899.—I have found *C. nupta* very plentiful this year, on tree-trunks in the Finchley Road, at Peckham Rye and East Dulwich; and on stone pillars at Broadstairs and at Ryde, in the Isle of Wight, they were particularly common.—C. W. Colthrup; 127, Barry Road, East Dulwich, S.E., Nov. 22nd, 1899.

Phigalia pedaria (pilosaria) in December.—I took a fine fresh male from a Chester electric lamp on Dec. 6th. The editorial note upon this eccentric species (xxiii. p. 134) will, I think, bear repeating:—"The usual time for the appearance of this species is perhaps between the middle of March and the middle of April, but it has been observed as early as November and December, and so late as the middle of June. *Vide* Entom. xx. pp. 64, 110; xxi. p. 91; xxii. p. 113."—J. Arkle; Chester.

Phlogophora meticulosa in December.—I captured fine and unusually dark specimens at the Chester electric lamps, on Dec. 4th, 6th, and

7th. The nights were very mild. Winter set in on the 8th, with the Snowdon range covered with snow—snow falling on the adjacent lowlands and sharp frost at Chester. Mr. South writes (xxxi. p. 293): "A specimen was taken at Putney on Dec. 26th, 1895 (Entom. xix. 65); and Mr. Armstrong tells me that he saw one on the last day of the year 1872, at Sandown Park." The late moths will hybernate, I suppose, as the species has been taken in February (Entom. xxxiii. p. 73) and March (p. 133). The first general appearance would seem to occur in June (p. 187), the second in August (p. 167), and a third in November (p. 19).—J. Arkle; Chester.

Lepidopterous Eggs on Sallow, &c.—The eggs described by Mr. J. Arkle (Entom. xxxii. p. 307), in his notes on "Lepidoptera in the Chester District," are, I should say, those of *Odonestis potatoria*. I have frequently found them on the under sides of the leaves of dwarf sallows, and hazel also, laid singly and in small clusters, and once in a compact little ring round a twig. It seems a peculiarity on the part of the female to almost always deposit the ova on anything rather than the natural food-plant, although I did once find a small batch on a stem of grass. Possibly, her weight prevents her getting a firm hold on the latter, and so she chooses something more substantial. I have noticed that there is always longish grass to be found close to the bush selected. The larvæ are very active and strong directly they are hatched, and do not appear to suffer at all by wandering about in search of food for a day or two.—(Miss) A. D. Edwards; 55, Gildredge Road, Eastbourne, Dec. 12th, 1899.

Stilbia anomala in North Wales.—I beg to record the capture, in August last, of a freshly emerged specimen of *S. anomala*, at Morfa Nevin, North Wales, and should be glad to know if any other reader of the 'Entomologist' has taken the species in this locality.—Mark A. Rollason; 29, Hickman Road, Sparkbrook, Birmingham, Dec. 7th, 1899.

Diphthera (Agriopis) aprilina in Moray.—I picked up a fine specimen of this moth, which had been stupefied by cold, on Nov. 8th, on the road at Darnaway Wood, Brodie.—Henry H. Brown; Rosefield, Elgin.

Lepidoptera, etc., in 1899.—The past season, which will long be remembered for its great heat during the summer months and the long spell of dry weather, has been somewhat a varied one entomologically, according to my experience in different parts of the country.

I have generally found the Rhopalocera in good numbers, some especially so, and this remark particularly refers to the "whites." *Lycæna argiolus* was again locally plentiful: in August, *L. icarus* and *Epinephele tithonus* were very abundant in some parts of Somersetshire. Early in May, on hills near Bath, I noticed a few specimens of *Vanessa cardui;* but I only saw one other specimen later in the season, even though I visited several other districts. *Colias edusa* I observed on very few occasions only in South Devon on the borders of Dartmoor, and not a dozen specimens altogether. *V. atalanta* was generally abundant, and *V. io* fairly so, in the same district. *Argynnis paphia* occurred freely in the woods. The last brood of *Polyommatus phlæas* occurred frequently also, in September, in Devonshire.

With regard to the Heterocera, their appearance varied throughout the season, the most noticeable fact being the frequent occurrence of *Macroglossa stellatarum,* both in town and country. I noticed the first specimen in

Breconshire on June 15th, and the last in South Devon in September. I should like to mention an instance of how these moths, like many others, rely on their protective resemblance. On one occasion I watched for some time two specimens flying up and down an old wall on the borders of Dartmoor, the day being bright, with clouds occasionally only passing over. The insects occasionally settled; at last one alighted near me, and appeared inclined to remain at rest. Cautiously approaching, I was able to place my hand completely over the moth, which remained perfectly still until I touched it with my fingers, when of course there was a great buzzing, until I allowed it to escape. In June some Noctuæ came freely to the blossoms of shrubs in Breconshire. Among these were *Hadena dentina*, *H. oleracea*, *Apamea unanimis*, *A. basilinea*, *Leucania pallens*, *L. comma*, *Cucullia umbratica*, &c.; one specimen of *Aplecta tincta* and *H. pisi* also came; *H. dentina* was extremely abundant. I did not try sugaring throughout the season, but a friend in Somersetshire complained of it not being at all productive. The Geometræ appeared fairly abundant.

Of other insects, wasps, so commonly seen last year, I did not observe a score of individuals, and on no occasion came across a nest; the common house-fly, on the contrary, was quite a plague in many places. Much injury was done in some parts by the larvæ of white butterflies; and I have heard complaints of that of *Carpocapsa pomonella* (the codlin moth).—T. B. Jefferys; Bath.

Lepidoptera at Winchester in 1899.—Lepidoptera were particularly abundant last season in the Winchester district; at any rate that was my experience, though I have not compared notes with other collectors there. Sugaring at Crabbe Wood, which I found such a failure in 1898, was much more productive this season, the following coming freely:—*Noctua baia*, *N. brunnea*, *N. rhomboidea*, *N. festiva* (including many beautiful varieties), *Aplecta nebulosa*, *Xylophasia hepatica*, *X. polyodon*, *Thyatira derasa*, *Rusina tenebrosa*, *Leucania lithargyria*, *Agrotis exclamationis*, *Hadena thalassina;* and less commonly, *Triphæna fimbria*, *T. subsequa*, *T. orbona*, *T. pronuba*, *Acronycta ligustri*, *Noctua dahlii*, *N. c-nigrum*, *N. triangulum*, *Thyatira batis*, *Cymatophora duplaris*, *Epione omicronaria*, *E. porata*, *Ligdia adustata*, *Platypteryx unguicula*, *Metrocampa margaritata*, *Halias prasinana*. Doubtless, if I had gone oftener, my list would have been considerably swelled; but I only went sugaring some ten or twelve times in all (and it was only thoughts of *Triphæna subsequa* that tempted me to go as often as I did), for I found that my nights were far more profitably spent collecting at the street lamps. Winchester has, within the last three or four years, discarded the oil lamps, with which she formerly used to "make darkness visible" in her streets; and by a great leap has arrived at very decent incandescent gas lamps. There is one lamp in particular which is most favourably situated on the outskirts of the town, and commands the view of a well-wooded valley. To this lamp I would repair every night during June and July (with the exception of the few occasions on which I went sugaring to Crabbe Wood), as soon as it was dark, armed with a chair, net, and killing bottles, besides the usual pocketful of pill boxes; and it was often past 1.30 or 2 a.m. before I could drag myself home to bed, so fascinated was I with my occupation, and so remunerative was the time spent in this manner. During those two months I took no less than two hundred and sixteen species (exclusive of Micros) at that one lamp, besides many beautiful and valuable varieties. I have kept a careful record of all my captures, though I shall not enumerate here all the common species which visited the lamp. By far my best capture was a grand form of *Euchelia jacobææ*, in which the usual crimson was entirely absent, and replaced by a brilliant golden yellow. The specimen, which is a large female, was evidently freshly emerged, and in absolutely perfect condition, the whole colouring being particularly rich; and a merely superficial examination of the insect would suffice to dispel any idea of its having undergone some "fading" process. In 1898 I was fortunate in taking a beautiful variety of this species at the same lamp, and recorded the capture in the 'Entomologist'; but this specimen puts it entirely in the shade. Next to this, my best captures were:—*Stauropus fagi* (1), *Notodonta dodonea* (1), *N. dictæoides* (1), *Plusia moneta* (1), *Cucullia lychnitis* (1), *C. chamomillæ* (1), *Aventia flexula* (4), and *Triphæna interjecta* (1). I also took in fair numbers:—*Neuria saponariæ*, *Agrotis cinerea*, *A. corticea*, *Hadena genistæ*, *Dysthymia luctuosa*, *Dianthœcia conspersa*, *D. carpophaga* (including one almost pure white), *Xylophasia sublustris*, *Hecatera serena*, *Acidalia imitaria*, *Eupithecia venosata*, *Anticlea rubidata*; and less commonly—*Sphinx ligustri*, *Smerinthus populi*, *Acronycta ligustri*, *A. rumicis*, *A. megacephala*, *A. aceris*, *A. tridens*, *A. psi*, *Demas coryli*, *Agrotis puta* (very variable), *Noctua triangulum*, *N. c-nigrum*, *N. rubi*, *N. augur*, *Axylia putris*, *Dianthœcia cucubali*, *D. capsincola*, *Hadena chenopodii*, *Habrostola urticæ*, *Mamestra persicariæ*, *Caradrina blanda*, *C. morpheus*, *C. cubicularis*, *Dipterygia pinastri*, *Cosmia trapezina*, *Heliothis marginatus*, *Hydrœcia nictitans*, *Chortodes arcuosa*, *Grammesia trilinea* (with a few of the var. *bilinea*), *Cucullia umbratica*, *C. verbasci*, *Cerigo cytherea*, *Euplexia lucipara*, *Aplecta herbida*, *A. nebulosa*, *Zeuzera æsculi*, *Xylophasia lithoxylea*, *Miana furuncula*, *M. fasciuncula*, *M. strigilis*, *Leucania conigera*, *L. comma*, *Hadena adusta*, *H. gemina*, *Notodonta dictæa*, *N. camelina*, *Ptilodontis palpina*, *Arctia fuliginosa*, *A. caia*, *Liparis chrysorrhœa*, *L. salicis*, *Nola cuculatella*, *Nudaria mundana*, *N. senex*, *Lasiocampa quercifolia*, *Calligenia miniata*, *Lithosia aureola*, *Platypteryx falcula*, *P. hamula*, *P. unguicula*, *Ennomos illustraria*, *E. tiliaria*, *Eurymene dolobraria*, *Acidalia inornata*, *A. remutata*, *A. immutata*, *Eupithecia coronata*, *E. subfulvata*, *E. abbreviata*, *E. nanata*, *E. exiguata*, *E. linariata*, *E. subumbrata*, *E. isogrammata*, *E. sobrinata*, *E. subnotata*, *E. assimilata*, *E. plumbeolata*, *E. centaureata*, *E. vulgata* (very common), *E. absinthiata*, *E. indigata*, *E. pulchellata*, *E. dodoneata* (1), *E. pusillata* (1), *E. rectangulata*, *Tephrosia extersaria*, *Macaria liturata*, *Phibalapteryx vitalbata*, *P. tersata*, *Geometra papilionaria*, *Amphidasys betularia*, *Boarmia roboraria*, *Melanthia albicillata*, *Melanippe galiata*, *M. rivata*, *M. unangula*, *M. procellata*, *Cilix spinula*, *Lobophora viretata*, *Anticlea berberata*, *Cidaria corylata*, *Scotosia rhamnata*, *S. vetulata*, *Eubolia mensuraria*, *E. bipunctaria*, *E. palumbaria*, *Urapteryx sambucata*, *Hemithea thymiaria*, *Eupistera heparata*, *Iodis vernaria*, besides very many other commoner species in more or less abundance. The insect which appeared in the greatest abundance was undoubtedly *Agrotis exclamationis*, with *Noctua festiva* and *Arctia menthastri* as good seconds. These three species were perfect nuisances, as also were *Hadena dentina*, *Rusina tenebrosa*, *Leucania lithargyria*, *Orgyia pudibunda*, and *Odontopera bidentata*, all of which absolutely swarmed. On the whole, I consider that the season must have been an exceptionally good one; and I have every reason to be more than satisfied with my list of captures.—H. W. Shepheard-Walwyn; Glensyde, Bidborough, near Tunbridge Wells.

Lepidoptera in 1899.—In summarising the past season, we are inclined to think, judging from our own experience, that it has been fairly productive as regards Lepidoptera in the perfect state; but the same cannot be said of larvæ, except as regards *Vanessa atalanta.* Sugar was rather uncertain, as throughout July scarcely an insect of note appeared; while June and August were decidedly better. We may remark that *Macroglossa stellatarum* was unusually abundant; we saw as many as five at one time hovering over *Phlox.* The following are the chief insects met with:—*Argynnis paphia* var. *valesina; Limenitis sibylla*, plentiful at Holmesley, but soon became worn; *Thecla betulæ*, bred; nice variety of a male *Lycæna corydon*, with the usual black border replaced with white, similar to those described by Mr. Fowler (*vide* Entom. xxxii. 269); *Hesperia actæon*, common at Swanage, in poor condition; aberrations of *Zygæna trifolii* and *Z. filipendulæ*, previously described by our friend Mr. Corbin (*vide* Entom. xxxii. 210); *Lithosia griseola* var. *stramineola*, a few (this species was abundant in 1898); *Emydia cribrum*, took a number at Verwood, also a fine series from the New Forest locality, lately discovered by Mr. Fowler, to whom we are indebted for showing us the exact spot; a specimen of *Cossus ligniperda* was brought to us in a tin, with the inevitable cabbage leaf for its food; three males and a female *Stilbia anomala*; about twenty *Caradrina ambigua*, netted, flying over heather; one *Agrotis agathina;* three *Epunda nigra*, best insect at ivy; *Boarmia cinctaria* and *Cleora lichenaria*, common at rest; *Geometra vernaria, Nemoria viridata*, and *Scodiona belgiaria*, rather plentiful; *Eugonia alniaria, E. fuscantaria*, and *Himera pennaria*, at gas lamps. Sugar produced:—*Calligenia miniata, Dipterygia scabriuscula, Caradrina morpheus, C. alsines, C. taraxaci, Leucania turca, Rusina tenebrosa, Agrotis suffusa, Noctua triangulum, N. stigmatica, N. brunnea, N. umbrosa, N. castanea, Triphæna ianthina, T. fimbria* (3), *T. subsequa, Hadena protea*, and *Catocala sponsa.* The latter was not plentiful; a tattered specimen occurred as late as September 9th. Of larvæ we may name:—*Bombyx trifolii*, three, all of which unfortunately died before pupating; a few *Asphalia ridens, Thecla betulæ*, and *Dasychira fascelina;* one *Agrotis agathina*, one *Chærocampa elpenor*; and *Nonagria arundinis*, common. Of the latter at least sixty per cent. were destroyed by some aquatic bird, probably moorhens and coots. Two *Acherontia atropos* were taken here during October. —F. & C. Bellamy: Ringwood, November 7th, 1899.

Notes from North Staffordshire.—*Macroglossa stellatarum* appears to have been abundant everywhere this season, and in North Staffordshire there were two broods. The first appeared in June, as on the 3rd of that month I saw at least half a dozen of these moths flying along under the sunny side of a stone wall in the moorlands in the extreme north of the county, and one specimen was netted by my friend Mr. E. D. Bostock. The second brood appeared about the middle of August, and most of my friends reported specimens as seen in their gardens about that time and into September. A specimen found its way into my conservatory in October. *Orgyia antiqua* I have never seen so far north in this county before, several larvæ and one imago having been taken near here, and one imago is reported to me as having been taken near Leek; these larvæ were all taken singly. *Vanessa atalanta* has swarmed this autumn, and I counted no less than thirty-five specimens of this beautiful insect close around me on flowers of scabious (*Scabiosa succisa*) at one time, and with them were five *V. io*, several *V. urticæ*, and innumerable Pierids. A female *Sirex juvencus* was given to me in October, taken at Madeley, in this county, and this is the first living Staffordshire specimen I have seen. Madeley is a colliery district, and this insect may have been imported with pit props. A male of this species, or of the closely allied *S. melanocerus* (Thoms) was brought to me in July, 1897, taken in a cottage window here. —John R. B. Masefield; Rosehill, Cheadle, Staffordshire, Nov. 7th.

SOCIETIES.

Entomological Society of London.—*December 6th*, 1899.—Mr. G. H. Verrall, President, in the chair.—Mr. Francis Gayner, of 20, Queen Square, W.C., and Mr. F. B. Jennings, of 152, Silver Street, Upper Edmonton, N., were elected Fellows of the Society. Mr. J. J. Walker exhibited a specimen of *Colias marnoana*, Rogenh., taken, with other examples, by Lieut. Constable, R.N., at Massowah, on the Red Sea. He considered this form to be only a dwarfed race of *C. hyale*, Linn.; and for comparison with it he showed specimens of the var. *nilgherriensis*, Feld., from Central India, and of the var. *simoda*, De l'Orza, from Japan. Dr. Chapman exhibited a series of specimens, selected from various English collections, together with a few foreign examples, in order to illustrate the English forms found within the genus *Fumea*. He also showed specimens of *sepium*, *betulina*, and *salicolella*, and remarked that the first of these species was very properly placed by Mr. Tutt in a new genus (*Bacotia*), since it is a transitional form, having as great affinities with *Solenobia* as with *Fumea*; while the other two species, though perhaps not distantly allied to *Fumea*, did not truly belong to that genus, and were well placed by Tutt in a new genus, *Prorilia*. Dr. Chapman then read some notes relating to the genus *Fumea*, and to characters, chiefly drawn from structure, by which the different species may be distinguished. Mr. Malcolm Burr called attention to Dr. Sharp's paper on "The modification and attitude of *Idolum diabolicum*," recently published in the 'Proceedings of the Cambridge Philosophical Society" (vol. x., part iii.). He exhibited the plate, drawn after nature by Mr. Muir, which illustrates the paper, pointing out that no drawing of this kind, showing a Mantid, in its natural colours simulating the petals of a flower, had hitherto been published. He also exhibited species of Mantodea of various genera, to show the different modifications by means of which insects of this group are made to resemble leaves and flowers. Mr. Kenneth J. Morton communicated a paper entitled "Descriptions of new species of Oriental Rhyacophilæ."—J. J. Walker and C. J. Gahan, *Hon. Secs.*

South London Entomological and Natural History Society.—*November 9th*, 1899.—Mr. A. Harrison, F.L.S., F.E.S., President, in the chair. (A Special Pocket-box Exhibition.)—Mr. McArthur exhibited series of *Triphæna comes* var. *curtisii*, from Hoy, *Aporophila lutulenta* var. *luneburgensis* and var. *sedi*, from Orkney; an extremely dark *Agrotis cinerea* and *Dianthœcia carpophaga*, with snowy ground tint. Mr. Adkin, a long and extensively varied series of *Boarmia repandata*. Major Ficklin, series of *Dianthœcia luteago* var. *ficklini*, showing a tendency to the tint of var. *lowei*. Mr. Kaye, long and varied series of numerous species of Sphingidæ, collected by himself in Jamaica, Trinidad, and South America, and representative of the chief subfamilies. Mr. H. Moore, specimens of the tropical American bee *Eulema dimidiata*, and read notes on its relation to the fertilisation of the orchid *Catasetum tridentatum*. Mr. Chittenden, a very large number of striking varieties and local species of Lepidoptera taken in the neighbourhood of Ashford, Kent, during the last quarter of a century, including *Aporia cratægi*, *Deilephila livornica*, *Plusia moneta*, and *Pachetra leucophæa*. Mr. Lucas, two scarce species of dragonflies, *Æschna mixta*, from Esher, and *Somatochlora metallica*, taken by Mr. C. A. Briggs in Inverness-shire; also three species of Coleoptera from Tripoli, *Anthia venator*, *A. 6-maculatus*, and *Scarites striatus*, large coast-frequenting Carabidæ. Mr. Colthrup, a very blue female of *Polyommatus icarus*, and a series of very dark *Melanippe fluctuata*. Mr. F. M. B. Carr, bred specimens of *Lithosia grisela* and var. *stramineola*, from Wicken; *Notodonta trepida*, from New Forest; *Drymonia chaonia*, from Bexley; and *Iodis vernaria*, from Shoreham. Dr. Chapman, seventeen species of the genus *Erebia*, taken during some two months spent in Switzerland this year, including *E. epiphron*, *E. mnestra*, *E. flavofasciata*, *E. glacialis*, *E. lappona*, *E. christi*, *E. ligea*, *E. æthiops*, and *E. gorge*. Mr. Mitchell, *Locusta viridissima*, from Folkestone Warren; the Coleopteron *Priomis coriarius*, from Richmond; and a smoky suffused example of *Smerinthus ocellatus*. Mr. Buckstone, exceedingly small specimens of *Pieris rapæ*, *P. napi*, *Hipparchia semele*, *Polyommatus* (*adonis*) *bellargus*, *Anthrocera filipendulæ*, and *Arctia caia*, the last being one of fifteen similar ones bred from larvæ fed on black currant leaves. He also showed numerous aberrations. Mr. Harrison, varied series of *Aporia cratægi*, *Pieris napi* var. *bryoniæ*, *Euchloë cardamines*, and *Leucophasia sinapis*, all from Meiringen, Switzerland. Mr. F. M. B. Carr, short series of *Agrophila trabealis* (*sulphuralis*), from Tuddenham; *Erastria fuscula* and *Bankia argentula*, from Chippenham; *Hydrelia uncula* and *Earias chlorana*, from Wicken; together with various species and varieties.

November 23*rd*.—The President in the chair.—Mr. Sich exhibited two specimens of *Platyptilia acanthodactyla*, bred from larvæ taken off *Geranium rotundifolium* at Chiswick; *Aglossa cuprealis*, showing extremes in size; and *Cucullia chamomillæ*, Chiswick, 1899. Mr. F. M. B. Carr, *Sirex gigas*, from Boldrewood, where several others had been seen, and numerous species taken at sugar at Wicken in June, and at Hailsham in August, at both of which times Lepidoptera were plentiful. Mr. R. Adkin, on behalf of Mr. Newman, a series of remarkable varieties:—*Argynnis paphia*, suffused with black; *Smerinthus tiliæ*, specimens with the central band reduced to a triangular blotch, and pale ground colour; *S. populi*, pinkish and dark forms; *Saturnia pavonia*, subdiaphanous, bred, the third year in pupæ; *Pygæra* hybrid *curtula* × *pigra* (*reclusa*), bred (out of one hundred and twenty specimens only three were males); and aberrant forms of *Arctia caia*, *Lasiocampa quercus*, &c. Mr. R. Adkin read a paper entitled "More Lazy Days by the Sea," being stray notes on a short holiday at Eastbourne. He touched upon many subjects that had come under his notice, including the comparative abundance and scarcity respectively of the commoner species of butterflies; the effect of the unusually warm summer on some of the moths; an immigration of *Pieris rapæ;* a collection of land

and freshwater snails that was made; and various other matters of interest. He exhibited series of some of the Lepidoptera and shells taken, in illustration of his remarks. Mr. Carpenter stated that he had examined numerous specimens of *Pyrameis cardui* in the spring, and found they were invariably females. He suggested, since he found no developed ova in them, that they were infertile, and that had they been paired they would not have emigrated.—Hy. J. Turner, *Hon. Report Sec.*

Carlisle Entomological Society.—*December 7th*, 1899.—Mr. G. B. Routledge in the chair.—The evening was devoted to the study of the genus *Apion*. Twenty-five species have been taken by the members of this Society round Carlisle. The following species were common:—*affine*, *apricans*, *dichroum*, *ebeninum*, *ervi*, *hæmatodes*, *humile*, *nigritarse*, *seniculum*, *ulicis*, *violaceum*, *virens*. Locally common:—*æthiops*, *carduorum*, *ononis* (at Silloth), *punctigerum*, *striatum*. Scarce:—*gyllenhali*, *loti*, *stolidum*, *viciæ*. Also *radiolus*, *spencei*, *marchicum*, and *assimile* have been taken in the neighbourhood. The following have also been recorded:—*Apion cerdo*, banks of Irthing (Bold); *æneum* (Stephens, Illust.); *onopordi*, lake district (Blackburn); *hydrolapathi* (Stephens, Illust.); but have not yet been taken by members of this Society.—G. B. Routledge.

Birmingham Entomological Society.—*October 16th*, 1899.—Mr. G. T. Bethune-Baker, President, in the chair.—Mr. R. C. Bradley exhibited two specimens of a *Solenobia* which he had previously exhibited as *S. wockii*, to which species they had been assigned by Mr. C. G. Barrett. Recently, however, they had been sent to Mr. J. W. Tutt, who thought they were a variety of *inconspicuella*, and by him had been sent on to Lord Walsingham and Mr. Durrant, who said they were certainly not *wockii*, but they did not quite know what to assign them to. Mr. Bradley also showed a number of Brazilian butterflies. Mr. J. T. Fountain, Lepidoptera obtained in the Valley of the Wye at the beginning of last August. Amongst other species he found *Apatura iris*, not uncommonly; *Thecla w-album*, common, but worn; *Vanessa polychloros*; *Grapta c-album*, common; *Triphæna interjecta*; *Tethea retusa*; *Catocala nupta*; &c. Mr. Colbran J. Wainwright, a short series of *Tephrosia extersaria*, from Wyre Forest, where he said the species had been quite abundant this year, although in previous years only odd specimens had been taken by various members; also a specimen of *Vanessa atalanta*, from Cornwall, and one of *Melanippe fluctuata*, from Handsworth, both of which were remarkably small examples of their species. Mr. G. T. Bethune-Baker, a number of Erebias, including many examples of *E. blandina*, from Britain and the Continent, and pointed out that the Scotch ones showed more red than the Swiss ones.

In the report of the meeting of August 21st (Entom. xxxii. 262), it was stated that *Leucania straminea* had been bred for the first time; this of course is a mistake, as there is a full description of the larva in Buckler's. At p. 288, line 16, the date 1884 should be 1894.

November 20th.—The President in the chair.—Rev. C. F. Thornewill exhibited specimens of *Lycæna bætica*, taken by Mr. Lowe, in Guernsey, this year; and said that there had apparently been a long immigration of the species this year, as Mr. Lowe had taken about eighty, and seen many others; also specimens of *Oporabia dilutata*, from Calverhall, Salop, where he said all the specimens were of the same dark leaden colour, with slight traces of markings, and were much darker than he had been in the habit of getting them at Burton-on-Trent; also a series of *Cænonympha typhon*, from Calverhall. Mr. R. C. Bradley, a long series of *Bombus hortorum*, taken this year, and showing a wide range of variation; var *harrisellus* in all sexes, from Droitwich; var. *subterraneus*, from his garden at Moseley, and various intermediate forms. Mr. J. T. Fountain, a number of insects taken during the year at Acocks Green, close to the town, including *Leucania comma*, *Agrotis exclamationis* (a variable series), *Anchocelis pistacina*, *Orthosia lota*, *Grammesia trigrammica*, &c. Mr. P. W. Abbott, a box full of Lepidoptera, including *Agrotis cinerea*, dark forms from Wyre Forest; *Sesia culiciformis*, with one white-banded specimen caught last year, and an orange-banded one caught this year; *Oporina croceago*, including two specimens which were light brown in colour, no trace of the usual orange coloration; one specimen of *Neuria saponaria*, new to the district; bred series of *Asphalia ridens*, including a black one; a series of *Cymatophora fluctuosa*, and a bred series of *Sesia sphegiformis*, all from Wyre Forest. He said that *C. fluctuosa* was comparatively common this year, though he had only taken odd specimens in previous years; also that he had caught one specimen of *C. octogesima* at Wyre Forest this year, thus completing the list of the Cymatophoridæ, all of which were to be obtained at this one locality in Wyre Forest. Mr. J. T. Fountain, *Spilosoma menthastri*, bred as recently as Nov. 17th; also *Sirex gigas* (male), from a colliery at Walsall, where it had emerged from some wood about eight hundred yards beneath the surface, at the beginning of October. Mr. G. T. Bethune-Baker, his collection of the genus *Œneis* and part of *Satyrus*; there was a nice series of *Œneis oëllo*, and various good Turkestan species, *Satyrus alcyone*, *S. hermione* and *S. circe*, in nice series, &c. Mr. C. J. Wainwright, a series of the handsome dipteron, *Asilus crabroniformis*, taken in Cornwall this year; a fine series of *Leptogaster cylindrica* from Herefordshire, where he had found it commonly; and various other Asilids.—Colbran J. Wainwright, *Hon. Sec.*

Kendal Entomological Society. — *November* 13*th*, 1899. — The President in the chair.—Mr. Littlewood read a very excellent paper on the ever-important subject of "setting." The lecture was thoroughly practical and comprehensive, and showed that no pains had been spared in its preparation. Mr. Littlewood showed an exhibition case of butterflies and moths, set in every conceivable position and carefully ticketed, illustrative of his remarks as to good and bad methods. He also showed a small appliance of tin, to secure uniformity of height in setting. He was heartily thanked for his efforts, and an interesting discussion followed. Mr. Cragg exhibited a specimen of *Melanippe hastata*, caught near 'Derby Arms,' Witherslack. Mr. Holmes, series of bred *Nemeobius lucina* and others, Rev. A. M. Moss, two drawers of Geometræ—the Fidoniidæ, Zerenidæ, Hyberniidæ, and Larentiidæ. Mr. Smith, *Heliodes arbuti* and two specimens of *Eubolia cervinaria*, bred from heather. Mr. Wright, *Mamestra furva* and *Cerigo cytherea*, taken at sugar.—A. M. Moss, *Sec.*

Lancashire and Cheshire Entomological Society.—*November* 13*th*, 1899. The President in the chair. Messrs. Tyerman, Harrison, Ackerby, Tonkin, and Dr. Chaster were elected members. Messrs. C. E. Stott, of Bolton; Chas. Farrar, of Liverpool; and Dr. Dobie, of Chester, were proposed for membership. Mr. C. G. Barrett, F.E.S., of London, gave an address on "The hairy eyes and abdominal tufts of Lepidoptera." In it he showed that though other characters must be relied upon for families, yet these features might be used to classify genera. In following out this plan he had found it necessary to divide the genera *Cymatophora* and *Mamestra* (amongst others) into hairy-eyed and smooth-eyed groups. He further found that in the latter genus the hairy-eyed species were produced from hairy larvæ, and the smooth-eyed from smooth larvæ. This was afterwards shortly discussed. He then referred to the ornamental and other tufts as being also useful for distinguishing genera, and showed by sketches how the abdominal tufts were in many cases of great use in keeping the spiracles free from dust. Mr. Barrett concluded his interesting address with a reference to Mr. Capper's magnificent collection of varieties, and the benefit he had derived from the study of them. Mr. John E. Robson, F.E.S., of Hartlepool, then addressed the meeting on the subject of "Arrangement." He spoke of the value of Stainton's Manual, and considered that his placing of *Papilio* at the head of the Rhopalocera was justifiable, as the genus possesses a greater degree of all-round perfection than any other. He thought that no system of classification could be perfect which was not based on total characteristics. How unreliable external characters often are he showed by reference to the close mimetic resemblances of many exotic butterflies belonging in reality to widely separated families. Mr. Robson concluded his remarks with a warm testimony to the value of the value of the work of the older entomologists. Mr. Newstead expressed his surprise at the attempt ever having been made to classify Lepidoptera by their wing-markings only, and thought that such an attempt was bound to prove futile. He referred to Mr. John Watson's Monograph of the Asiatic genus *Calinaga*, which the society had just received, as a step in the right direction. Mr. Newstead then detailed the interesting life-history of *Selandria atra*, the pear-tree sawfly, as observed by himself, and exhibited a case of specimens illustrating it throughout. To destroy them he recommended the use of Paris-green. He also communicated notes on *Piophila casei*, the cheese-hopper, showing how very tenacious of life it was, by the fact of larvæ which had been subjected to water, methylated spirit, glycerine, and absolute alcohol producing perfect insects! The following exhibits were made:—Species of the genus *Oporabia* with genitalia photographs, by Mr. F. N. Pierce; eleven drawers of Lepidoptera taken at the Chester electric lamps, including *Amphidasys betularia* (type, black and intermediate vars.), *Acronycta alni*, *Ephestia splendidella*, &c., by Dr. Dobie; vars. of *Abraxas ulmata* and *A. grossulariata*, by Mr. B. H. Crabtree; spring captures in the New Forest, by Dr. Cotton; an ingenious device for setting Lepidoptera with greater accuracy, by Mr. Geo. O. Day; a case of Lepidoptera, by Mr. J. Collins; pupæ of *Nemeobius lucina*, by Mr. Prince; a box of insects for distribution, by Mr. John Robson; *Cleora glabraria*, a new record for North Wales, by Mr. F. Birch, Hon. Sec.

RECENT LITERATURE.

Fauna Hawaiiensis; or, the Zoology of the Sandwich (*Hawaiian*) *Isles.* Vol. I. Hymenoptera Aculeata, pp. 1–122; two Plates and Map. By R. C. L. Perkins and A. Forel (March 20th, 1899). Vol. II. Orthoptera, pp. 1–30, and two Plates (August 19th, 1899); and Neuroptera, pp. 31–89, and three Plates (September 25th, 1899). By R. C. L. Perkins. Edited by Dr. D. Sharp.

Isolated in the midst of the vast North Pacific Ocean, 2350 miles from San Francisco and 3500 miles from Kamtchatka—the nearest continental points east and west—and separated from them by some of the profoundest depths of ocean; a little nearer to, but still far away from, the coral islands and reefs of the South Pacific, connected with them only by scattered islets and atolls—almost or entirely uninhabited,—the Sandwich Islands, or Hawaiian group, undoubtedly form to the student of the geographical distribution of animals the most interesting country in the world.

Chiefly through the collections made by Blackburn, some knowledge has been acquired, during the last quarter of a century, of the salient characteristics of the insect fauna; but, having regard to the increasingly numerous importations into the country, a renewed survey was very desirable before the extinction or further differentiation of the existing fauna took place. This has been effected by the explorations of Mr. Perkins during a period of several years, and his collections are now being systematically worked out by a number of zoologists. One naturally reserves a final summary of the characteristics of the insect fauna till the last entomological contribution has appeared; meanwhile some notices from time to time of the various parts may be interesting.

Of Aculeate Hymenoptera one hundred and ninety-eight species are recorded, though of these twenty-eight are importations, all the main divisions of the group, except the ants, being well represented by endemic forms. The Fossores embrace six genera and thirty-four species, thirty-one of the latter being endemic. The wasps comprehend two genera and eighty-eight species (eighty-six species endemic). The bees comprise three genera and fifty-six species, of which fifty-two species are indigenous. Of ants twenty species (belonging to twelve genera) are recorded, of which only one "has any claim to be considered endemic." "So far as one can judge from a study of the relationship of the endemic species to one another, all the Mimesidæ, Crabronidæ, Eumenidæ, and the bees of the genus *Nesoprosopis* could have been evolved from four species which reached the islands at some very remote period, one of the four species of course representing each group. The total absence of any representative of so many groups of the Aculeata, certainly not less fitted to pass over the great distances between the islands and other lands, and for which the country is admirably adapted, is a point greatly in favour of the view that the numerous species of each of the families represented arose from a single immigrant species, and the examination of the structures of the species themselves greatly supports this view. How rarely an immigrant can have arrived from without can be judged from the great number of species which fail to cross the short distances between the islands themselves."[*]

"An important fact in connection with the Hawaiian species is their variability. This is most noticeable in the bees, Crabronidæ, and Mimesidæ, a great many of the species in these groups being in a very unstable condition. The variation is not confined to differences in size, colour, &c., but affects important structures, in which it is unusual to find any noticeable variability; and to this is due the extreme difficulty of determining and describing the numerous species, the specific characters frequently having to be taken from structures which are obviously variable. In striking contrast with the groups above mentioned are the species of *Odynerus*. Very few of the eighty-six species exhibit any variation of note, and this, when it occurs, is nearly always of an unimportant character (*e.g.*, colour). From this one would infer that the Odyneri have now reached the maximum of species that the islands can support in the present condition of the lepidopterous fauna, on which, as they prey on caterpillars, they are dependent. The bees, on the other hand, are not similarly restricted; for, with flowers abundant at all seasons, the islands, so far as one can see, are capable of supporting much greater numbers of these than of wasps."

The Orthoptera are very remarkable. Seventy-three species are known, of which six belong to the earwigs, cockroaches, Mantids, and short-horned grasshoppers;[†] the other forty-nine belonging to the long-horned grasshoppers and crickets. Of the former group one species only "has any claim to be considered indigenous"; of the latter, forty-three (nearly eighty-eight per cent.) are endemic. The Phasmatids are entirely unrepresented.

Of the Neuroptera (sens. lat.), one hundred and eleven species are present: fifty-four being Hemerobiidæ (lacewings and antlions), of which about fifty are indigenous; twenty-nine dragonflies (about twenty-five endemic) and twenty-five Psocids (nearly all confined to these islands); one Embiid and two Termites complete the list, caddisflies and mayflies being unrepresented.

Exigencies of space will not permit a longer notice; but enough has been written to show that the work is one of exceptional interest and value. As for the paper, printing, and illustrations, it is sufficient to say that the Cambridge University Press is the publisher.

G. W. Kirkaldy.

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[*] Percentage of peculiar species in the different islands:—

	Hymenoptera aculeata	*Hemerobiidæ.*	*Dragonflies.*
Kauai	90·9	87·5	77·7
Oahu	66·6	60	40
Molokai	26·3	75	12·5
Maui	31·6	75	10
Lanai	7·6	—	—
Hawaii	81·4	80	11·1

[†] Seven earwigs are known, all introduced—some probably at an early date, as Bloxham notices, in 1825, a "black earwig" ('Voy. Blonde,' p. 252).

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ON THE NOMENCLATURE OF THE GENERA OF THE RHYNCHOTA, HETEROPTERA AND AUCHENORRHYNCHOUS HOMOPTERA.

By G. W. Kirkaldy, F.E.S.

The present memoir consists of a chronological catalogue of the works in which new genera have been proposed, or genotypes fixed, or which are connected with the settlement of the generic nomenclature of the Heteroptera and Auchenorrhynchous Homoptera. I have indicated synonymy where the genera are homotypical, and have also adjoined the latest authoritative synonymy, in most instances in footnotes. The memoir will be divided into four parts, *viz.*:—

1. A list of works from 1758–1843 (terminating with Amyot and Audinet-Serville's 'Suites à Buffon, Hémiptères,' the foundation of modern Rhynchotal science), with the genera, genotypes, &c., therein contained.

2. 1844–1876, concluding with the fifth volume of Stal's monumental 'Enumeratio Hemipterorum.'

3. 1877–1900, finishing with the last year of the present century.

4. An alphabetical recapitulation of all the genera from 1758–1900, and their types.

This is, as I believe, the first time that these Rhynchota have been taken in hand as a whole in such a manner; and as I cannot hope that I have succeeded to a greater extent than other entomologists who have essayed work on similar lines, in altogether avoiding errors of omission and commission, I beg my colleagues who discover any mistakes to inform me, either personally or through the press, so that they may be amended in a subsequent part of the work. To enable them to check my results as readily as possible, a summary of the "rules" that I held in view while conducting my researches are annexed.

A. Strict Priority without exception.

The majority of existing nomenclatorial systems seem to me to fail in their object on account of their complexity. Although most authors now profess to conform to the "rule of priority," they admit so many exceptions, on one plea or another, that the original idea is entirely lost sight of. The chief end of nomenclatorial systems is stability; and though complete stability is neither possible nor desirable, an approximate attainment should be possible, but only—as I believe—by a rigid and scrupulous adherence to the "rule of priority—without exception."

So-called "Classical Emendations" have been entirely disregarded; while tautonyms, names geographically or descriptively misleading or incorrect, and politically or theologically offensive, have been strictly adhered to, the original orthography of the author being in every case retained, unless, of course, preoccupied.*

B. Formation of Genotypes.

I have considered that a species may be fixed as the type of a genus by any of the following methods:—

1. *By being the only species described* (or, in the case of a species previously described, by a reference to the species and its author) *at the foundation of the genus.*

Ex. 1. *Anotia*, W. Kirby, 1819, type *bonnetii*, W. Kirby, 1819.

Ex. 2. *Phymata*, Latreille, 1802, type *crassipes* (Fabr., 1775).

2. *By being indicated as the type by the author of the genus at its foundation.*

Ex. *Gerris*, Fabricius, 1794, type *lacustris* (Linn.), Fabr. 1794. This method was instituted by Fabricius (as far as Rhynchota are concerned) in 1794.

These two principles appear to me indisputable.

3. *By the subsequent removal of one or more species to other genera, thus indirectly fixing the type.* An exception is made of course in the removal of species to genera with the definition of which (as at *that time* accepted) they did not accord, or by their removal back again into a compound genus.

Ex 1. *Neides* was founded by Latreille in 1802 for two species, viz. *tipularius* and *clavipes.* In 1803 Fabricius erected a genus *Berytus* with type *tipularius;* thus indirectly fixing *clavipes* as the type of *Neides.* In the second volume of Lethierry and Severin's General Catalogue, *clavipes* is placed in *Berytus* and *tipularius* in *Neides!*

Ex. 2. Fabricius used *Tettigonia* (recte *Tetigonia*) for *Cicada*

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* Emendations to displace names already in existence—unless emended for the express purpose of replacing a preoccupied name—are not here considered as separate names, e.g. "*Aphana,*" Burm. is not considered as a name separate from *Aphæna*, Guér.

Linn. Geoffr., and *Cicada* for *Tetigonia*, Geoffr.; this reversement does not affect the type-fixations in either of these, or in any other, genera.

4. By the statement of *any* subsequent author that "X" is the type of a certain genus, *provided that it be one of the original species of that genus*, and that such fixation be permissible by the previous operations of other authors.

Ex. 1. *Cercopis*, Fabr., 1775, type *spumaria* (Linn., 1758), Latr., 1802.

Ex. 2. The type of *Membracis*, Fabr., 1775, is stated by its author (in 1803) to be *atrata*, but this statement is invalid, as *atrata* was not an original species.

N.B. The description (or mention with sufficient reference) of one species only in a genus, in a general systematic work [such as Amyot and Serville's 'Suites à Buffon, Hémiptères'], is a valid indication of the type; this does not hold however in a faunistic work, nor in works published previous to 1794. When two or more species have been described or indicated in such a work, the type should be subsequently founded on one of those species. Where (as for example in Amyot and Serville) one species, (say) "*striata*," is described, and the authors say "add '*maculata*,' '*venusta*,' '*irrorata*,' &c.," '*striata*' should be the type.

The following considerations also come under this heading:—

α. Many authors consider that a name only (or even a figure!) is sufficient to establish a genus. This does not appear to me to be reasonable. The essential for the establishment of the validity of a genus is surely a description, however short, displaying the salient characteristics whereby it differs from its nearest allies. Now take the case of (say) *Laternaria*, Linn., 1764; a name only, without a line of description. To find out in what way *Laternaria* essentially differs from *Cicada*, 1758, one would then have had to prepare a table of the species of the former and compare it with a similar one of the remaining species of the latter! This, I contend, is not the establishment of a genus. In the second case, a figure in the Atlas of Belanger's Voyage to the East Indies (Insects by Guérin) is the warrant for the genus "*Euryptera*" (dropped in the letterpress by Guérin himself).*

β. Subgenera are here treated for nomenclatorial purposes as genera—that is to say, a subgenus on being raised to full rank dates from its first proposal as a subgenus. The typical subgenus (*i.e.* that which contains the type of the genus) should bear the same name as the genus.

Ex. 1. *Microvelia*, erected by Westwood, 1834, as a subgenus of *Velia*, has priority AS A GENUS over *Hydroëssa*, Burmeister (full genus 1835).*

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* I also refuse to acknowledge the validity of a species based upon a figure only, even though detailed.

Ex. 2. *Corixa*, Geoffr., 1762, has type *geoffroyi*, Leach. The typical subgenus is therefore the section containing *geoffroyi*, Leach (i. e. *Macrocorisa*, Thomson, which ought to be known as *Corixa*, Geoffr., in sp.), and not that containing *striata* (Linn.), which is not the type of the genus. I have previously rectified the synonymy of the subgenera of *Corixa* in the Entom., 1898, p. 252.†

γ If a genus, having no type assigned, be divided into two or more subgenera (none of the latter bearing the generic name), the fixation of the genotype (and of the typical subgenus) may be determined subsequently as follows:—

(α) *Any* subsequent author has the right to fix the type of the genus out of any one of the subgenera, the name of *that* subgenus then becoming a true synonym of the genus. If all the subgenera be raised to full rank at the same time, the above procedure takes place. N.B. If a genus, having no type assigned, be divided into two or more subgenera, *one of which bears the generic name*, the type *must* subsequently be fixed from that subgenus.

(β) If some of the subgenera be raised to generic rank, the remaining one falls as a synonym of the genus if one be left, or α comes into operation if two or more be left.

All these unavoidably complicated methods of type-fixation would have been obviated, had authors always unmistakably indicated (since 1794) the types of their new genera; unfortunately, many modern authors still continue this neglect.

(δ.) Many genera which were undoubtedly strictly co-extensive, each with some other genus or genera, originally ——, have been, through the operations of later authors, made heterotypical and used separately, *e.g.* (1) *Asiraca*, Latr., 1796, and *Delphax*, Fabr., 1798; (2) *Poekilloptera*, Latr., 1796, and *Flata*, Fabr., 1798; (3) *Laternaria*, Linn., 1764, and *Fulgora*, Linn., 1767; (4) *Ploiaria*, Scop., 1786, and *Emesa*, Fabr., 1803; (5) *Neides*, Latr., 1802, and *Berytus*, Fabr., 1803; and many others.

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* This is in direct opposition to the opinion given in my "Guide to the Study of British Waterbugs" (Entom. 1898–1900), when treating of the genus.

† I was wrong, however, in proposing "*Basileocorixa*" for the "*striata*" group; amend as follows:—

Subgenus 3. *Arctocorisa*, Wallengr., 1894, type *carinata* (Sahlb.), Kirk, 1900.
= *Corixa* (*Corisa*) [coextensive, but heterotypical] auctt., nec Geoffr. in sp.
= *Glaenocorisa* (p) and *Corisa*, Puton, 1880.
= *Glaenocorisa* and *Corixa*, Saund., 1892.
= *Basileocorixa*, Kirk., 1898.

(To be continued.)

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from vol. xxxi. p. 211.)

Crambites.*

Schœnobius forficellus, *Thnb.*—Ballincar, Co. Donegal (*R.*): Mayo and Cork (*S.*); Killarney (*B.*); Kilkerran Bay, Galway (*J. J. W.*). Phœnix Park, Dublin (*K.*).

S. mucronellus, *Schiff.*—One at Favour Royal, Tyrone (*K.*).

Crambus pratellus, *L.*—Common everywhere. A white female, Clonbrock (*R. E. D.*).

C. dumetellus, *Hb.*—Favour Royal, Tyrone; Markree Castle, Sligo.

C. sylvellus, *Hb.*—Killarney by Bouchard (*B.*).

C. hamellus, *Thnb.*—Killarney by Bouchard (*B.*).

C. pascuellus, *L.*—Common, and widely spread. Mr. Watts reports it scarce, however, in the district about Belfast.

C. margaritellus, *Hb.*—Dalyston near Loughrea, Co. Galway; Markree Castle, and near Sligo (*K.*).

C. pinellus, *L.* — Killarney, Ardtully, and Sneem, Co. Kerry (*K.*); Blarney, Co. Cork (*Mr. Hogan*); Favour Royal, Tyrone (*K.*); Belfast, local (*W.*).

C. perlellus, *Scop.*—Throughout Ireland very abundant, sometimes with the variety *warringtonellus.*

C. selasellus, *Hb.*—Belfast (*Mr. Hogan*); Armagh (*J.*); Favour Royal, Tyrone; Markree Castle, Sligo; Cork (*McArthur*).

C. tristellus, *Fb.*—Very common.

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* The following portion of this Catalogue is virtually a reprint of the list of Irish Micro-lepidoptera furnished to Mr. Birchall, many years ago, by Mr. Charles G. Barrett, who has now carefully revised it, and assisted in adding records of more recent captures, nearly all of which have been submitted to him from time to time for identification. The localities with the initial *R.* appended have been kindly furnished me by Mr. G. Carpenter, of the Science and Art Museum, Dublin, from a collection made by Mr. Russ. It is possible that in some cases, however, the captures were made about Ballincar, Co. Donegal, rather than in the county of Sligo. The localities given without any following initials represent the original records of Mr. Barrett, without whose valued assistance it would have been impossible for me to have compiled a reliable list. Those with the initial *K.* are captures of my own, and have been submitted to Mr. Barrett. I have also to thank the few workers in this group who have collected in Ireland and have assisted me with lists of localities, especially Messrs. Watts, Campbell, and Hart. It is regrettable that we are still in ignorance of the resources of Ireland as regards this large section of our fauna, the present Catalogue being meagre in the extreme in every respect, and should not be taken as other than an instalment, which it is to be hoped the investigations of subsequent entomologists will render more complete and representative of the Irish Micro-lepidopterous fauna.

Crambus inquinatellus, *Schiff.*—Glengarriff (*K.*).

C. geniculeus, *Haw.* — Abundant on the Dublin coast: Newcastle, Co. Down (*W.*); Sligo (*McC.*); Donegal (*G. V. H.*); Dursey I., Co. Kerry (*K.*); Roches Pt., Co. Cork (*K.*); Cork (*S.*).

C. culmellus, *L.*—Common everywhere.

C. hortuellus, *Hb.*—Common everywhere.

Phycidæ.

Anerastia lotella, *Hb.*—Malahide (Portmarnock), abundant; Co. Dublin (*B.*); Belfast. Crossfarnoge Point, Wexford (*K.*).

Ilythyia semirubella, *Scop.*—Dursey I., Kerry (*K.*).

Homœosoma nimbella, *Zell.*—Malahide and Howth, Co. Dublin, Wicklow coast (*B.*); Sligo (*R.*).

H. senecionis, *Vaughan.*—Newcastle, Co. Down, one (*W.*); Magilligan, Co. Derry (*Curzon*).

Ephestia elutella, *Hb.*—Very common.

Plodia interpunctella, *Hb.*—Dublin (*S.*).

Phycis fusca, *Haw.*—Generally distributed, and common.

P. dilutella, *Hüb.*—Galway and Howth, June, July, August (*B.*); Island Magee, Co. Down, one (*W.*).

Dioryctria abietella, *Zinck.*—Clonbrock, Co. Galway, one (*R. E. D.*); Sligo (*R.*).

Nephopteryx spissicella, *Fb.*—Ardtully near Kenmare, Co. Kerry (*K.*): Clonbrock, Co. Galway (*R. E. D.*).

Pempelia palumbella, *Schiff.*—Howth, taken by Mr. Sinclair. Specimen confirmed (*C. G. B.*).

Rhodophæa consociella, *Hüb.*—Co. Cork (*McArthur*).

Galleria mellonella, *L.*—Common.

Aphomia sociella, *L.*—Common.

Achroia grisella, *Fb.*—Common.

Tortrices.

Tortrix podana, *Scop.*—Co. Dublin, common (*B.*); Sligo (*R.*). Favour Royal, Tyrone (*K.*).

T. xylosteana, *L.*—Cos. Dublin and Wicklow, plentiful (*B.*); one near Belfast (*W.*).

T. rosana, *L.*—Cos. Dublin and Wicklow, plentiful; Sligo (*R.*).

T. heparana, *Schiff.*—Cos. Dublin and Wicklow; Derry (*C.*); Sligo (*R.*).

T. ribeana, *Hb.*—Generally common.

T. unifasciana, *Dup.*—Co. Wicklow, common; Belfast, common (*W.*); Coolmore, Co. Donegal, and Armagh (*J.*); Sligo.

T. costana.—Sligo (*R.*).

TORTRIX VIBURNANA, *Fb.*—Killarney (*B.*); Belfast, abundant (*W.*); Markree Castle, and near Sligo.

Var. *donellana.—Carpenter.* Tuam, feeding on pine, Ent. xxiv. 253.

T. PALLEANA, *Hb.*—Howth, Co. Dublin (*B.*); common about Belfast district (*W.*); Armagh (*J.*); Sligo (*R.*).

T. VIRIDANA, *L.*—Common about Belfast district (*W.*); Sligo (*R.*).

T. MINISTRANA, *L.*—Limavady, Co. Derry (*B.*); Favour Royal, Tyrone, common; Markree Castle, &c., Sligo (*K.*).

T. FORSTERANA, *Fb.*—Howth (*B.*); Sligo (*R*).

DICHELIA GROTIANA, *Fb.*—Powerscourt, Co. Wicklow, common (*B.*); Derry (*C.*); Sligo (*R.*).

AMPHYSA GERNINGANA, *Schiff.*—Wicklow Mts. ? (*B.*); Churchill, Co. Armagh (*J.*); Sligo (*R.*).

A. PRODROMANA, *Hb.*—Sligo (*R.*); Enniskillen (*P.*).

LEPTOGRAMMA LITERANA, *L.*—Killarney (*B.*).

PERONEA SPONSANA, *Fb.*—Howth (*B.*); Sligo (*R.*).

P. RUFANA, *W. V.*—Sligo (*R.*).

P. MIXTANA, *Hb.*—Powerscourt, Co. Wicklow (*B.*); Belfast (*W.*); Sligo (*R.*).

P. SCHALLERIANA, *L.*—Wicklow Mts. ? (*B.*); Armagh (*J.*); Island Magee, Co. Down (*W.*); Sligo (*R.*). Enniskillen (*P.*).

P. COMPARANA, *Hb.*—Armagh (*J.*). Enniskillen (*P.*).

P. PERPLEXANA, *Bar.*—Armagh, abundant (*J.*); Sligo (*R.*). Enniskillen (*P.*).

P. COMARIANA, *Zell.*—Limerick (Ent. vol. viii. p. 89); Armagh (*J.*); Mayo (*S.*).

P. PERMUTANA, *Dup.*—Howth, on the cliffs (*B.*).

P. VARIEGANA, *Schiff.*—Howth, on the cliffs; Belfast, abundant (*W.*); Armagh (*J.*); Sligo (*R.*). Enniskillen (*P.*).

P. CRISTANA, *Fab.*—Co. Cork (*McArthur*).

P. HASTIANA, *L.*—Macgilligan, Co. Derry (*R. C.*); Belfast, one (*W.*); Mayo (*S.*); Cromlyn, Co. Westmeath, Clonbrock, Co. Galway (*R. E. D.*); Sligo (*R.*). Armagh (*J.*); Enniskillen (*P.*).

P. MACCANA, *Tr.*—Mayo (*S.*).

P. FERRUGANA, *Tr.*—Wicklow Mts. and Killarney (*B.*); Sligo (*R.*). Enniskillen (*P.*).

P. CALEDONIANA, *St.*—Local in the Belfast district (*W.*).

P. ASPERSANA, *Hb.*—Howth (*B.*); Armagh (*J.*); Sligo (*R.*). Enniskillen (*P.*).

P. SHEPERDANA, *St.*—Sligo (*R.*)

Rhacodia caudana, *Fb.*—Blarney, Co. Cork, Belfast (*B.*); Favour Royal, Tyrone (*K.*); Inishowen, Co. Donegal (*W. E. H.*); Sligo (*R.*); Cappagh, Co. Waterford (*K.*).

Teras contaminana, *Hb.*—Belfast (*B. & W.*); Howth (*B.*); Armagh (*J.*); Sligo (*R.*); Cappagh, Co. Waterford (*K.*).

Dictyopteryx loeflingiana, *L.*—Galway (*B.*).

D. holmiana, *L.*—Belfast (*B. & W.*); Sligo (*R.*).

D. bergmanniana, *L.*—Common everywhere.

D. forskaleana, L.—Sligo (*R.*).

Argyrotoza conwayana, *Fb.*—Abundant in Galway and Wicklow (*B.*); Favour Royal, Tyrone, abundant (*K.*); Belfast, abundant (*W.*); Armagh (*J.*); Sligo (*McC.*); &c.

Ptycholoma lecheana, *L.*—Killarney (*B.*).

Penthina betulætana, *Haw.*—Wicklow Mts., Holywood, Co. Down (*B.*); Sligo (*R.*).

P. sororculana, *Zett.*—Killarney (*B.*).

P. pruniana, *Hb.*—Abundant everywhere.

P. ochroleucana, *Hüb.*—Co. Cork (*McArthur*).

P. variegana, *Hb.*—Dublin, and Cork? (*B.*).; Armagh (*J.*).

P. dimidiana, *Tr.*—Killarney (*B.*); Enniskillen (*P.*).

P. sauciana, *Hb.*—Killarney (*B.*); Belfast (*W.*).

P. marginana, *Haw.*—Clonbrock, Co. Galway (*R. E. D.*).

Antithesia salicella, *L.*—Sligo (*R.*).

Hedya ocellana, *Fb.*—Sligo (*R.*).

H. aceriana, *Dup.*—Sligo (*R.*).

H. dealbana, *Fröl.*—Sligo (*R.*).

H. neglectana, *Dup.*—Sligo (*R.*).

Spilonota incarnatana, *Hb.*—Howth, abundant, and on the sandhills (*B.*); Derry (*C.*).

S. trimaculana, *Haw.*—Sligo (*R.*); Clonbrock, Co. Galway (*R. E. D.*).

S. rosæcolana, *Dbl.*—Sligo (*R.*).

S. roborana, *Tr.*—Howth, common (*B.*); Derry (*C.*).

Pardia tripunctana, *Fb.*—Counties of Dublin and Wicklow, common (*B.*); Sligo (*McC.*); Armagh (*J.*).

Aspis udmanniana, *L.*—Dublin coast, common (*B.*).

(To be continued.)

A LIST OF BUTTERFLIES OBSERVED IN SWITZERLAND IN JULY, 1899.

By A. F. Rosa.

The following species of butterflies and varieties were met with between the 1st and 13th July last summer, during a tour in the Valais and adjacent Bernese Alps, the exact districts visited being the Visp Valley, Zermatt and neighbourhood (seven days); between Leuk and Kandersteg, over the Gemmi (three days); and in the vicinity of Aigle (two days).

The weather was very cold and unsettled at the beginning of the month, and afterwards inclined to remain dull for several days. The last few days were, however, bright and warm.

Papilionidæ.

Papilio machaon.—Occasionally seen in all the districts visited, as Zmutt, St. Niklaus, Leuk, Leukerbad, Kandersteg, Aigle (frequently), and Le Sepey; several fine specimens being secured.

Parnassius apollo.—Very common in the Nicolai Thal and Zmutt Thal; also between Aigle and Le Sepey.

P. delius.—A few taken flying languidly along the sides of the Visp at Zermatt; also a good many found lying on a marshy bank, on the ground among the grass.

Pieridæ.

Aporia cratægi.—Very common in the Zmutt and Nicolai Thals; also at Leukerbad, Kandersteg, Aigle, &c.

Pieris brassicæ.—Abundant at Leukerbad; seldom seen elsewhere.

P. rapæ.—Only one or two seen.

P. napi.—A few at Stalden, and plentiful on the Gemmi in the pine forest above Gastern-Thal. — Var. *bryoniæ.* Very fine specimens from the Gemmi; also one or two at Stalden.

P. callidice.—A short series of this fast flier on the Riffelberg and Gorner Grat; also taken on the Gemmi Pass.

Euchloë belia var. *simplonia.*—Turned up occasionally at Täsch, Stalden, Zmutt, and on the Gemmi.

E. cardamines.—Two males and several females taken, and others seen.

Leucophasia sinapis.—Common in the neighbourhood of trees and bushes between Zermatt and Visp; also taken at Aigle, &c.— Ab. *erysimi.* Three specimens of this variety at Randa, Leuk, and Aigle respectively; also a few between this and the type.

Colias phicomone. — Not rare, and in first-class condition at St. Niklaus, Zmutt, and on the Gemmi Pass; the depth of the yellow ground colour varying considerably, one about as deep as *G. rhamni* male, and from this seem to vary to the very palest yellow; none of the males, however, are as white as the female (*phicomone*).

C. hyale.—Pretty common, but seldom in good condition. Zmutt, Leukerbad, and on the Gemmi near Kandersteg; also at Le Sepey.

C. edusa.—One seen flying swiftly up the valley at Stalden, and another seen near Zermatt; neither captured.

Gonopteryx rhamni.—Several of both sexes seen; those captured were worn, evidently hybernated.

LYCÆNIDÆ.

Thecla spini.—Rather common in the same localities, and along with the next species.

T. ilicis.—Common, sporting about the road between Aigle and Le Sepey, and flying round the tops of trees, which at some parts reach conveniently from a lower level within easy striking distance. Like the last species, difficult to get in anything like good condition. Usually minus a tail or rubbed on upper side.

Polyommatus virgaureæ.—This fine copper was common in some fields at St. Niklaus, and in Zmutt Thal, &c. All males.

P. hippothoë.—The crimson copper, scarce at the same places as the last; also one at Stalden; all these being males. One worn female was taken at Le Sepey.

P. alciphron var. *gordius.* Two fresh specimens taken at St. Nicklaus.

P. phlæas.—One seen on the wing at the same place, but not taken.

Lycæna ægon.—At Täsch, Randa, Visp, &c.

L. argus.—Hanging to grasses and reeds on marshy ground beside the road at Täsch. Seemed to be plentiful.

L. astrarche.—Turned up now and then, never common, and always in indifferent condition.

L. eros.—This pretty little blue occurred in the same localities as *L. corydon*, but not commonly. One specimen captured is not of the usual pale glossy greenish colour, but a decided pale blue.

L. icarus.—Not very many seen, but was occasionally met with in all the three districts visited.

L. eumedon.—Single specimens captured at St. Nicklaus, Täsch, Stalden, and Le Sepey.

L. bellargus. Several, mostly worn males and one female, at Zmutt, St. Nicklaus, &c.

L. corydon.—With the exception of *L. minima*, probably the most common blue, all males, and mostly in grand condition, as at Täsch, Zmutt, and Le Sepey (very abundant).

L. hylas.—In the same localities as *L. bellargus*, but more common. Appeared to be going over also.

L. damon.—Very common on the road to Ormont Dessous. The blue upper contrasts strongly with the brown under side when in flight. Freshly emerged, and all males.

L. minima.—Very abundant, and sometimes at high elevations, as near the summit of the Gemmi Pass, probably 7600 ft. above sea-level.

L. semiargus.—Worn, at St. Niklaus on the 3rd. I was surprised to find many fresh specimens at the same locality on the 7th. Taken elsewhere also, as at Visp, Kandersteg, Aigle.

L. arion.—Only one specimen of the type, taken at St. Niklaus.—Var. *obscura.* Not uncommon on a rocky slope near Täsch. Several in a meadow at St. Niklaus, also at Zmutt; one also taken at Aigle on a path in the valley.

NYMPHALIDÆ.

Limenitis camilla.—On the road at Aigle, just emerging.

L. sibylla.—One very small-sized specimen taken at Aigle.

Vanessa c-album.—Two seen, but neither captured; one on a teasel-head, the other settled on the road, both near the same spot between Aigle and Le Sepey.

V. polychloros.—One very bright individual captured at Visp.

V. urticæ.—Not common, but occasionally at highish elevations; some fresh, some almost scaleless.

V. io.—Two very much worn specimens at Stalden.

V. atalanta.—Several hybernated individuals in the Visp Valley.

Melitæa phœbe.—Not uncommon at Zmutt, Stalden, Randa, &c. One with the submarginal row of fulvous spaces, upper side, hind wings centred black; under side normal.

M. didyma.—Common; specimens from Zmutt, St. Niklaus, Randa, Stalden, and Le Sepey.

M. dictynna.—Common from Täsch to Visp; also taken on the Gemmi, and at Leukerbad.

M. athalia.—Pretty common at Randa, Täsch, and Le Sepey.

M. parthenie var. *varia.*—Randa and Visp; three specimens only. One has the ground colour of the central area of the upper side fore wings pale (whitish).

Argynnis euphrosyne.—A few at Täsch, and on the Gemmi Pass above Kandersteg.

A. pales.—A few on the Riffelalp; also in Zmutt Thal, and on the Gemmi Pass.

A. lathonia.—Single specimens taken at St. Niklaus, Zmutt Thal, Stalden, and Leukerbad. Rather common at Zermatt, unfortunately, however, difficult to capture flying with the wind, but quite recognisable. One was netted here, and another found floating alive in a mountain stream.

A. aglaia.—One specimen taken at Stalden, and in the Zmutt Thal quite commonly.

A. niobe.—Common in the Nicolai and Zmutt Thals. Most specimens approach the var. *eris*, of which several were taken.

A. adippe.—Not uncommon in all the districts visited.

A. paphia.—This species was just beginning to make its appearance at Aigle, &c., when I was leaving.

SATYRIDÆ.

Melanargia galatea.—Very abundant, especially in the Visp Valley below St. Niklaus, and at Aigle.

Erebia melampus.—Several taken on the Gemmi; also at Leukerbad and Kandersteg.

E. pharte.—A few on the Gemmi, and at Kandersteg.

E. manto (*pyrrha*).—One at Kandersteg behind the Bear Hotel.

E. ceto.—Common in the Zmutt and Nicolai Thals.

E. œme.—Not uncommon at Kandersteg, and on the Gemmi. Of this variable species I have one without any trace of ocelli or rusty markings on the upper side, and with only one minute pupilled spot on the under side of the hind wings. Another has two ocellated spots at the apex of the fore wings, upper and under side, and a series of five on the under side of hind wing, represented above by two. Most specimens are intermediate between these two. I also took several which are very strongly marked, so as to be quite distinct from any of the above, and which appear to be identical to the var. *spodea* of the Austrian and Styrian Alps. The best of these has, fore wing above and below, two well-marked apical spots, and another lower down. Hind wing (upper side) has a series of six, and underneath seven well-marked ocelli, all pupilled white.

E. stygne.—Not uncommon; Kandersteg, Gemmi Pass, and Leukerbad.

E. glacialis.—One specimen taken on the Gemmi, and others seen. One seen also near the top of the Gorner Grat, probably 2000 ft. above the snow-line.—Ab. *alecto.* One netted on the Riffelberg.

E. lappona.—Very common on the Riffelberg, and at the summit of the Gemmi.

E. tyndarus.—Single specimens at St. Niklaus and Täsch.

E. gorge.—Riffelalp, Gemmi Pass, and Kandersteg; not uncommon.—Ab. *erynis.* One or two very closely approaching this form.

E. goante.—One at Stalden, and another at St. Niklaus.

E. ligea.—Several of this fine *Erebia* were taken flying about the road at Le Sepey.

E. euryale.—Kandersteg and Zmutt Thal.

Satyrus hermione.—Common about rocky places from Stalden to Visp; also between Leuk and Leukerbad, and at Aigle.

S. alcyone.—One or two at Stalden.

S. semele.—Very large specimens, only males, at Visp, Stalden, Aigle, &c.

S. actæa var. *cordula.*—Common in the Rhone Valley, Nicolai Thal, Zmutt Thal, and at Aigle, &c.

Pararge mæra.—Abundant about stones and rocks between Täsch and Stalden; also seen at Aigle on the road.—Ab. *adrasta.* One at St. Niklaus.

P. megæra.—One battered specimen at Visp.

P. achine.—Several of this curious butterfly taken at Le Sepey.

Epinephele lycaon.—Single specimens from Inden and Stalden.

E. ianira.—Visp, Aigle, &c.

E. hyperanthus.—Only a few worn specimens seen at Visp, &c.

Cœnonympha arcania var. *darwiniana.*—Several taken at St. Niklaus, Zmutt, &c.—Var. *satyrion.* St. Niklaus.

C. pamphilus.—Common at St. Niklaus, &c.

HESPERIIDÆ.

Spilothyrus lavateræ. — One taken and another seen at Stalden; conspicuous among the swarms of *H. thaumas* and *H. lineola*, settling on the ground at the puddles.

Syrichthus carthami.—One or two at St. Niklaus.

S. fritillum var. *alveus.*—Common.—Var. *serratulæ*, Täsch.—Var. *carlinæ.* Leukerbad.

S. andromedæ.—Two fine specimens near the Schwarzbach, on the Gemmi Pass.

S. malvæ.—Leukerbad.

S. sao.—Le Sepey.

Nisoniades tages.—One worn specimen at Visp.

Hesperia thaumas.—Swarmed about damp ground at the sides of roads and paths.

H. lineola.—More abundant than the preceding.

H. sylvanus.—Also rather common.

20, Dundonald Street, Edinburgh.

COLLECTING IN THE ISLE OF LEWIS.

By H. Stuart Fremlin, F.E.S.

I had some three weeks' collecting last summer in the Isle of Lewis, being there from the middle of June to the end of the first week in July. Insects were fairly numerous, but the species were limited in number. The weather was fine generally, exceedingly fine even, for the district, although usually overcast until about 1 p.m. The chief part of my collecting was confined to the neighbourhood of Stornoway, although I searched a little in other parts of the island.

To those of my readers who do not know the Lewis, a short description may be of interest. The island consists almost entirely of moorland, mountains, and small lakes; the soil is peaty, and very little cultivation is carried on. The only trees on the island grow on the Matheson estate at Stornoway, where they have been planted. (This wooded part formed my chief collecting centre.) Stornoway itself is the chief town, and lies on the coast; it is mainly interested in herring fisheries, and in the month of June it is extremely difficult to obtain lodgings, on account of influx of people interested in the fishing trade.

I commenced collecting very soon after my arrival. The first species that I took was *Hypsipetes impluviata*, and this occurred commonly in the neighbourhood of trees; I found some at rest on the tree-trunks during the day, and netted others in the evening.

Melanippe montanata soon made its appearance, and was very generally distributed; I continued to take freshly emerged specimens during the remainder of my stay. I took a few *Odontopera bidentata*, which were attracted by my lamp. *Larentia pectinitaria* made its appearance about the end of June; it was very common in certain spots; on one evening I saw practically no other species; they appeared to be the only moths about in that particular place, and could be seen crawling up grass-stems and flying about everywhere.

Hepialus velleda was common everywhere, but difficult to catch. *H. hectus* occurred in one or two glades, but I did not find it at all common. *H. humuli* appeared about the latter end of June, and occurred in every place that I worked at all; it was the only moth that I took on Little Bernera Island.

Camptogramma bilineata apparently emerged two or three days before I left, and I did not find it in any numbers until the last few hours of my stay in the Lewis. It appeared to be local, occurring on rocks and in the growth surrounding them, but only in certain places; one might search for an hour in the heather around the base of rocks without seeing a single specimen, then suddenly one would find eight or ten together. Possibly it is more generally distributed later in the season.

Sugaring was a failure; I do not know if it was from the absence of sugar-loving moths, bad nights, or bad sugar. Whoever wishes to sugar in that neighbourhood had better bring his own rum. I thought I could buy any form of alcohol easily there, but rum does not appear to be a very coveted liquor, as it is not retailed out, and I had to buy a bottle. This bottle was sealed and marked "rum," and contained some sort of spirit, but what it really was I do not know, and the moths could not make it out either, I suppose, as they didn't turn up.

I saw very few species of butterflies. *Lycæna* (*Polyommatus*) *icarus* occurred sparingly, the males being much the more common.

Cœnonympha davus was abundant on the moors, and gave me a rare chase over the boggy ground. *Epinephele ianira* was fairly common. The only Vanessid I saw was one *Vanessa atalanta*.

Besides the insects above mentioned I took a few dragonflies, which I gave to Mr. Lucas, who, I believe, finds them of some interest.

Any collector from the South of England coming for the first time to this northern region must, like myself, have noticed many things that were quite new to him. The short night threw me out entirely with regard to time. I would see the sun in the afternoon fairly high in the heavens, and think it must be about 6 o'clock, and then find to my astonishment that it was 8 p.m. Evening commenced at about 9.30, and then *velleda* would fly for an hour or so, after which time it would be dark enough for the small Geometers to show themselves, and I could net these and other moths until 11 p.m. I usually collected until midnight, and on returning home could see the time by my watch, as the whole northern sky had a yellow glow which lit up the surrounding country and made all objects distinctly visible. This twilight was the nearest approach to night, for in an hour the light would shine more strongly in the east, a lark commence to sing, and the morning break. The chief annoyances to collecting were clegs during the day and midges in the evening. Of the two I prefer clegs, as they can easily be seen and only occur in dozens, but the midges are almost invisible, and occur in clouds over the moor. They bite every part not protected, and I found it quite impossible to stand still for five minutes when they were about; even whilst walking I used my handkerchief continuously to my face, neck, and hands. Happily both of these torments only occurred on the moors, the wood was quite free from them.

I was fairly satisfied with the result of my collecting, and, although I took no rarities, yet most of the insects were variable. The best forms occurred in *C. bilineata* and *O. bidentata*. The *M. montanata* were of the Northern type, but yielded few striking varieties.

NOTES ON SOME TUDDENHAM LEPIDOPTERA.

By E. G. J. Sparke, B.A., F.E.S.

I have heard it said, and seen it written, that the special Lepidoptera of Tuddenham and the surrounding district are getting scarcer year by year. Having had good opportunities of testing this by two annual visits for some years past to the late venerable rector of Tuddenham, a near relative of mine, I would assert generally that this is not the case.

Take *Agrophila trabealis* (*sulphuralis*), for instance. By making a close search of Tuddenham for one whole day in June, I found certain places where they almost swarmed if looked for at the right time. In 1897 they were especially plentiful, and I had the pleasure of circulating nearly two hundred specimens amongst friends in various parts of the United Kingdom. Last year (leaving them quite alone in 1898) I again had the pleasure of distributing over one hundred good specimens, taken from a small rough patch of ground not larger than the garden of a suburban villa. I could easily have made it five hundred if I had gone into a field of stunted rye-grass of many acres close by, growing or trying to grow against rabbits and drought. It has struck me as very curious that there should be a small grasshopper on these wastes which flies almost exactly like *A. trabealis*—the one seems to imitate the other. *A. trabealis* is also fond of flying on to the bare field, and while sitting on a clod or a stone is only visible to a trained eye; I only once have boxed one on the ground.

Acidalia rubricata certainly seems scarcer than formerly, though still plentiful in other places, and in Norfolk; but still in certain spots I found it still possible to get a fair series in one afternoon, This year the first brood was late—there were sharp frosts at Tuddenham in June; I caught several beautiful ruddy specimens the first week in July. This insect does not fly as a rule till about 4 p.m. I have never seen it at rest, though I looked very closely for it. Its red colour no doubt protects it, as many of the wastes are distinctly red-coloured from the scanty herbage on them.

With regard to *Lithostege griseata*, I would say that this moth depends more than the others on its restricted food-plant, the flixweed (*Sisymbrium sophia*). I have taken it in ten different places in Tuddenham by observing closely and making note of where the food-plant grew the year previously. I have hardly touched it for two years, as it is a scheduled insect. The larvæ are plentiful, but in confinement many emerge crippled.

I now come to *Dianthœcia irregularis*. The larvæ are still plentiful at the right time, but I consider it useless and destructive to try and breed them unless you are on the spot to get fresh food (*Silene otites*). I take a few of the best specimens by walking the banks where the food grows, using a good lantern, which you can set down on the ground when a capture is made, and a black gauze net, in which you can see to box or bottle a light insect like *D. irregularis* easily.

I found *Heliothis dipsaceus* the year before last quite plentiful on the wing, and later I saw a good many larvæ about on various plants, especially on *Silene inflata*.

I do not collect micros; but in conclusion I would say that I saw *Spilodes sticticalis* in great numbers at light, though a few are put up in the daytime as one walks along the waste places.

Finally, I would add a word of warning to those who wish to collect in this interesting district. Get leave from the head keeper, or someone in authority, as the whole neighbourhood is now swarming with game, and a long journey there may only end, unless one is very fortunate, in being sent back empty-handed and angry.

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WHAT IS THE PROPER NAME OF *LOPHYRUS*, LATREILLE?

By T. D. A. Cockerell, N.M., Agr.Exp.Sta.

Through the kindness of Dr. T. S. Palmer I have been able to see Gistel's 'Naturgeschichte des Thierreichs,' in which *Anachoreta* is proposed as a new name for *Lophyrus*, Latr., 1802, which is preoccupied in Zoology (*Lophyrus*, Poli, 1791). Gistel's new name dates from 1848, and, even if we abandon *Lophyrus*, is not required. *Diprion*, Schrank, 1802, apparently included a species of *Lophyrus*, but the first species is a *Megalodontes*, and the second a *Monoctenus*. *Nycteridium*, Fischer-Waldheim, 1806, was based exclusively on a *Lophyrus*, and should apparently be adopted. The name *Nycteridium*, Günther, 1864, as applied to a genus of reptiles, will have to be changed.

In this same work of Gistel's we have *Caliendra* proposed for *Chrysantheda*, Perty, *Matella* for the geometrid *Ephyra* (not *Ephyra*, Peron, 1809), *Marmaryga* for *Hypoderma*, Latr., *Gyra* for *Phycis*, Fab., and a number of other substitutions which should be critically examined by someone who has the leisure and opportunity.

Mesilla Park, New Mexico, U.S.A.

BRITISH DRAGONFLIES OF THE OLDER ENGLISH AUTHORS.

By W. J. Lucas, B.A., F.E.S.

1. *Moses Harris's 'Exposition of English Insects,'* 1782.

In this book, which consists of a number of plates, moderately well printed and hand-coloured, together with descriptive letterpress in English and French, seven plates are devoted to dragonflies.

Plate XII.

Large Brown=*Æschna grandis* (fig. 1, ♂; 2, ♀; 3, nymph (very poor); 4, face).

Plate XVI.

Large Green=*Æschna cyanea* (fig. 1 ♂ and ♀; 2, eggs).

Plate XXIII.

Forcipata ♀ = *Cordulegaster annulatus* ♀ (fig. 3).

Anguis ♂ =*Æschna cyanea* ♂ (fig. 4).

Plate XXVII.

Coluberculus= ? (fig. 1). [*Æ. mixta*, *Æ. juncea*, and *Æ. cærulea* have all been suggested as the insect described by Harris under the name of *coluberculus;* but it does not seem possible to decide which he intended, or whether it might not have been *B. pratense*, the female of which is figured on the same plate, and which also would be on the wing in June.]

ænea=*Cordulia ænea* (fig. 2). [There seems no good reason for supposing that this is *S. metallica* as some have suggested.]

aspis=*Brachytron pratense* ♀ (fig. 3). [The thorax is too red.]

Plate XXIX.

minius=*Pyrrhosoma nymphula* (fig. 1, ♀; 2, ♂). [The description is better than the figures, the male being especially poorly coloured.]

æreus=*Enallagma cyathigerum* possibly (fig. 3, ♀; 4, ♂).

lucifugus=*Agrion puella* possibly (fig. 5, ♂; 6, ♀, *b*, nymph). [With about equal probability *æreus* might be *cyathigerum;* and *lucifugus*, *puella*. The red eyes must be a mistake, except for *minius*. The nymph is very poor.]

Plate XXX.

splendens ♀ = *Calopteryx splendens*, ♂ (fig. 1).
„ ♀ = *C. virgo*, ♂ (var. *anceps*), (fig. 2).
„ ♂ = *C. splendens*, ♀ (fig. 3).
splendeo ♀ = *C. virgo*, ♂ (var. *anceps*), fig. 4.
„ ♂ = *C. virgo*, or *splendens*, ♀, fig. 5; nymph of this class, fig. 6. [In fig. 4 the body is that of a female, but the appendages look like those of a male. As the white speck is specially referred to in fig. 5, it can hardly have been overlooked in fig. 4, so the specimen must be looked on as a male. The description of fig. 5 seems to suit a female *C. splendens*, but the colour of the wings is brown, pointing to ♀ *C. virgo*.]

Plate XLVI.

Maculata = *Libellula quadrimaculata*, ♂ (fig. 1).
Fugax = *Libellula fulva* ♂ (fig. 2). [It has dark tips to the wings, however, as is customary in the female.]
Vulgata = *Sympetrum sanguineum*, ♂ (fig. 3). [The shape and description—deep blood-coloured scarlet—of the abdomen are sufficient to point this insect out as *sanguineum* ♂.]
Flaveola = *Sympetrum striolatum*, ♂, immature (fig. 4). [Apart from the fact that the wings are practically without saffron coloration, Harris speaking about the insect as if it were common points it out as *S. striolatum*.]

Kingston-on-Thames.

NOTES AND OBSERVATIONS.

The Range in Britain of Epichnopteryx pulla, Sterrhopteryx hirsutella, Acanthopsyche opacella, and Pachythelia villosella.—I find it quite impossible to obtain satisfactory evidence of the range of these species in Britain, more particularly of *E. pulla*. It is recorded from Kent, Somerset and Cambridgeshire, and is exceedingly abundant in some years in Kent and Essex (in one or two localities). Yet there are whole counties—southern, midland and eastern—for which no record exists. It must exist fairly abundantly in Surrey, Sussex, Suffolk, Bucks, Berks, Norfolk, Herts, Middlesex, one would suspect, yet there are either only single records traceable or none at all for these counties. Will those lepidopterists who have captured any of these species, or who possess local lists in which they are mentioned, please be kind enough to send me the records? I shall be extremely grateful. I need hardly add that I want the localities for insertion in the second volume of 'British Lepidoptera' now in press.—J. W. Tutt; Westcombe Hill, S.E., Jan. 15th, 1900.

District Lists of Lepidoptera.—A useful addition to the local lists of British Lepidoptera is 'The Butterflies and Moths of Malvern,' by Messrs. W. Edwards and R. F. Towndrow. The species included in this list are only those that have been actually found within a six-mile radius of Malvern. Rhopalocera show a total of forty-seven species, among which we note *Aporia cratægi* (1858), *Pieris daplidice* (inserted doubtfully), *Limenitis sibylla* (1861), *Apatura iris* (1864–66), *Polyommatus* (*Lycæna*) *acis* (1885). None of these butterflies have been observed in the district since the years quoted, but Mr. Edwards states that he found a brood of the larvæ of *A. cratægi*, feeding upon hawthorn, in 1876. The Sphingina number twenty-four species; Bombycina, about seventy species; Noctuina, upwards of one hundred and eighty species; Geometrina, over one hundred and sixty species; Pyralidina, forty-seven species. The "Micro-Lepidoptera" appear to have received but little attention, as only fifty-one species of Tortricina are mentioned, and the Tineina are omitted altogether.

In the 'Transactions' of the Hull Scientific and Field Naturalists' Club, vol. i. pt. 2, pp. 55–64) is a list, drawn up by Mr. J. W, Boult, of the Macro-Lepidoptera collected within eight miles of Hull. The compiler has only included species obtained by himself or other members of the Club during the past twenty-five years. Two hundred species are catalogued, and of these twenty-five are butterflies.

Retarded Emergence of Sphinx ligustri.—I took some full-grown larvæ of *S. ligustri*, which soon entered the pupa state, in September, 1898. All these, except one, attained the perfect state in the following June. The imago from the remaining pupa did not emerge until Aug. 22th, 1899. Is not this rather unusual? The conditions in which the pupæ were kept favoured a much earlier appearance of the moths.—(Rev.) W. J. Leigh Phillips; The Cottage, Parkwood Road, Tavistock, Jan. 11th.

Unusual Pairing of Satyrus semele.—This year I captured a fine female of *S. semele* with two males "in coitu." This struck me as worth recording.—(Rev.) W. J. Leigh Phillips.

New African Dragonflies.—Dr. F. Karsch ('Entomologische Nachrichten,' No. 24, December, 1899) gives a lengthy account of a new genus, *Atoconeura*, of African dragonflies, and of eleven new species:—*Trithemis pruinata*, *T. furva*, *Atoconeura biordinata*, *Orthetrum pollinosum*, *Æschna dolobrata*, *Notogomphus stuhlmanni*, *Libellago consueta*, *L. trifaria*, *Pseudagrion gerstæckeri*, *Agriocnemis inversa*, and *Lestes uncifer*.—W. J. Lucas.

New Work on British Odonata.—The publication of 'British Dragonflies' (L. Upcott Gill) at the commencement of the year affords an opportunity for those who secure a copy to thoroughly digest the contents before the active season begins. The study of our native dragonflies has probably been neglected by collectors because of difficulty in the way of readily determining the species. With the aid, however, of the clear descriptions and admirable figures given in this book by the author and artist (Mr. W. J. Lucas), the correct identification of captures becomes a comparatively easy matter.

Setting Relaxed Insects.—Relative to the above (Entom. xxxii. 307), I mentioned I had been using (unsuccessfully) cement, which I bought of Messrs. Watkins and Doncaster. I think, in justice to that firm, I should state that the cement was not sold to me for the purpose for which I used it, and that in other respects I have found it an excellent cement.—Arthur H. Rydon; Awbrook, Lindfield, Sussex, Jan. 3rd, 1900.

CAPTURES AND FIELD REPORTS.

Macro-Lepidoptera of the Galashiels District in 1899. — The entomological year of 1899 has now almost drawn to a close, and it has not been without its surprises as well as its disappointments. The chief features of the season in this district may be summed up as follows:—1st, the absolute failure of sallowing in spring; 2nd, the extraordinary abundance of *Macroglossa stellatarum* in June; 3rd, the great attractiveness of sugar to the summer noctuids in June and the first half of July; 4th, the exceeding commonness of *Vanessa atalanta* in August and September; 5th, the unusual paucity of noctuids at sugar from the middle of July up to date.

The first captures of the season were made on Feb. 19th, when I took *Hybernia progemmaria* and *H. leucophæaria* at rest on a paling. On the 22nd, searching a whitethorn hedge in the evening produced a quantity of *H. rupicapraria* males, but no females were found. *Cucullia verbasci* began to emerge in my breeding-cage on Feb. 27th, and continued to do so until March 12th. My breeding-cage was kept in a room in which there was always a fire burning, and the pupæ were damped in open weather only during the winter.

March 12th was a bright sunny day, and I ventured to go in search of the hybernated larvæ of *Bombyx rubi*, which I thought might be enticed from their winter quarters by the warmth of the sun; in this I was not disappointed, and had the satisfaction of picking up eight larvæ, six of which subsequently proved to have been ichneumoned; the other two pupated successfully after having wandered about in my breeding-cage for more than a fortnight. A few cocoons of *Arctia fuliginosa* were picked up from amongst the heather.

On March 13th, searching the undergrowth on the outskirts of a wood with a lantern, about 8 p.m., was productive of *Larentia multistrigaria* males in any quantity; females much scarcer. From March 28th to April 4th *Acronycta menyanthidis* emerged in my breeding-cage, all fine perfect specimens.

Sallowing was tried for the first time on March 30th, and several times afterwards up to April 29th, but proved quite a failure. The only species obtained were one each of the following:—*Cidaria miata*, *Calocampa exoleta*, *Tæniocampa gothica*, *T. rubricosa*, *T. instabilis*, and *T. cruda*.

On April 1st I obtained the larvæ of *Thera variata* by beating Scotch fir; these did well in confinement, and the imagines emerged about the beginning of June. Towards the end of the month the imagines of *Cidaria suffumata* and var. *piccata*, also *C. silaceata*, were netted at dusk. Larvæ collecting was also indulged in about this time after dark, and the following species were bred from them in June and July:— *Boarmia repandata*, *Noctua triangulum*, *N. brunnea*, *N. baia*, *Triphæna fimbria* (few this year), *T. ianthina*, *T. orbona*. One lovely specimen of *T. subsequa* emerged about the beginning of July, and a correspondent to whom I sent some pupæ of *T. orbona* told me that he had bred a specimen of *subsequa* from amongst them.

On May 13th *Anarta myrtilli*, *Phytometra ænea*, *Eupithecia nanata*, *Fidonia atomaria* were taken. One night during the end of the month I sugared the posts of a wire fence crossing a moor, and captured about sixteen specimens of a moth which I took to be small examples of the grey var. of *gemina*. It was the only visitor to sugar that night. I was rather pleasantly surprised the other day when I was told by an undoubted authority that my *gemina* were *Mamestra furva*.

On May 21st an excursion to the habitat of *Orgyia fascelina* resulted in the finding of only three larvæ, which, along with a cocoon of *Arctia fuliginosa* and a single specimen of *Euclidia mi*, made up the bag for the day.

In June things began to look more lively, and this was certainly my busiest month of the year. I frequently had as many as two hundred specimens on my blocks at one time. About the beginning of the month the imagines of *Thera variata* were very plentiful dancing round the tops of young pines at dusk. I succeeded in getting a very variable series of this species. Other species taken at the same time were *Selenia illunaria*, *Odontopera bidentata*, *Cabera pusaria*, *Fidonia piniaria*, *Larentia pectinitaria*, *Eupithecia lariciata*, *Melanthia ocellata*, *Melanippe rivata*, *M. subtristata*, *M. montanata*, *Rumia cratægata*, and *Camptogramma bilineata; Hypsipetes impluviata* was obtained from the alders. On June 11th a male *Bombyx rubi* emerged from one of my two pupæ, and on June 19th, to my great joy, a female made her appearance. The following evening my friend Mr. Lait and myself visited the habitat of the species for the purpose of assembling the males with her, and, to make sure that if we failed in one object we might succeed in another, we took our sugaring kit with us. The ground was reached about 7 p.m., and my friend volunteered to sugar the alders while I made a reconnaissance across the heath with madame. Matters looked rather serious; having wandered about in every direction of the compass for an hour and a half without seeing a trace of anything, I suggested to my friend, who had again joined me, that we give it up. The suggestion had hardly been made when a male *B. rubi* came sailing over a clump of whins, and promptly settled down on the box containing the female; this made an easy capture. Then the fun grew fast and furious; there were sometimes four males dashing about at the same moment. It was exactly 8.30 p.m. when the first capture was made, and by 9.15 there were thirty specimens in the cyanide bottles, and every one of them in as good condition as if bred. A soft undulating wind was blowing, and I noticed that each time this wave of air occurred it was invariably followed almost immediately by fresh arrivals, thus proving that the scent must be carried a good distance by the wind. We lit up about 9.45 for the round of the sugared trees, and I confess that I was fairly staggered by the swarms of insects that were attracted by the sweets. On some trees where the treacle had run down to the base as many as one hundred and fifty insects were counted. *Leucania comma* took the lead in point of numbers, *Agrotis exclamationis* making a good second; *Hadena dentina* was third, and *H. oleracea* fourth. The following were also taken commonly where not marked otherwise:—*Noctua plecta*, *Mamestra brassicæ*, *N. c-nigrum* (a few), *Triphæna pronuba*, *Xylophasia rurea* var. *alopecurus*, *X. lithoxylea*, *X. polyodon* var. *infuscata*, *Miana strigilis*, *M. fasciuncula*, *M. literosa* (a few), *Rusina tenebrosa*, *Hadena adusta* (a few), *H. thalassina* (a few), *H. pisi* (one), *Apamea basilinea* (a few), *A. gemina* (two; grey var. common), *A. oculea*, *Euplexia lucipara* (scarce), *L. pallens*, *L. lithargyria* (four), *Acronycta ligustri* (this species was commoner in July), *A. rumicis* (a few), *A. psi* (one seen on the sugar, but not secured), *Mania typica* (one), *Dianthœcia cucubali* (one), *Agrotis suffusa* (in ribbons, three), making a grand total of thirty species seen at sugar, and twenty-nine taken.

During June *Macroglossa stellatarum* created a flutter among entomologists in the district by its appearance in extraordinary numbers, attracted principally to the blossom of wallflower and lilac. Up to the present season it has occurred here very sparingly—in some years never being observed at all—and its sudden appearance in such large numbers is quite unaccountable. On June 23rd the larvæ of *Hypsipetes elutata* were found very common, rolled up in the leaves of sallow. On the 24th I had a forenoon after that nimble little fellow *Melanippe tristata,* and found him as abundant and as lively as usual. Several *Arctia menthastri* were taken at rest during the month, but all typical; also one *Hecatera serena.*

Sugaring in July was only productive up till the middle of the month, when it suddenly stopped, and did not improve again throughout the season. In addition to most of those before mentioned in June, the following species were taken in July:—*Noctua depuncta* (scarce), *T. subsequa* (one fine specimen), *T. fimbria* (one), *T. orbona, N. baia, N. brunnea, N. xanthographa, N. festiva, Caradrina cubicularis, Charæas graminis, Thyatira batis* (one seen, not taken), *Agrotis porphyrea.* The following were also netted at dusk:—*Metrocampa margaritata, Ellopia fasciaria, Cidaria immanata, C. testata, C. fulvata, Larentia didymata,* and *L. cæsiata.*

Butterflies observed during July were *Pieris brassicæ, Vanessa urticæ, Satyrus ianira, S. hyperanthus, Cœnonympha pamphilus, Polyommatus phlœas, Lycæna alexis, L. agestis* var. *artaxerxes.*

In August *Erebia blandina* occurred, and *Vanessa atalanta* was very abundant, being commoner than its congener *V. urticæ.*

The only species taken at sugar up till November were *Agriopis aprilina* few), *Phlogophora meticulosa* (one), *Hadena proteus* (few), *Stilbia anomala* (one), *Anchocelis litura, A. lunosa* (one taken from the clutches of a centipede), *Scopelosoma satellitia, Cerastis vaccinii,* and *Calocampa exoleta.* On some evenings not a single insect turned up, and whereas last season I took upwards of fifty *Epunda nigra* in September, this year I never even had a sight of the insect. However, all things considered, I have not much reason to grumble, as I have had a very pleasant season's collecting.—James C. Haggart; Galashiels, Nov. 14th, 1899.

Notes on the Season of 1899 in Kent.—Personally, I have little to complain of during the past season, and think that the summer collecting was far better than in the two previous years. From the end of May to the beginning of September wonderful weather prevailed. Spring collecting was somewhat late, and, with the exception of a few very enjoyable days at the New Forest at Easter, sallows were not worked (*ante*, p. 133). Treacle and light are not very easily managed, except when one is staying near the field of operations, but a week at the fens in June (*ante*, pp. 196–9) and another at Hailsham in August were very successful, especially with regards to the "sweets." Most of the collecting referred to in these notes is therefore day-work.

January was mild and wet up to the last week, when it became finer and colder. *Larentia multistrigaria* came out indoors in a warm room.

In February nothing was seen until the 26th, when a single *Hybernia leucophæaria* was taken at Bexley. A fine female *Dasychira pudibunda* was bred on the 7th, and another *L. multistrigaria* on the 16th. As to weather, there were scarcely two days together alike.

In March weather was mild enough up to the 18th; but there was then a very severe week of cold. A visit to Bexley on the 5th produced a lovely male *Phigalia pedaria,* and three *H. leucophæaria;* and a second visit on the 12th, a really hot day, produced *P. pedaria, Anisopteryx æscularia, H. leucophæaria,* and *Tæniocampa stabilis.* Treacle produced twenty-five *Cerastis vaccinii* and nineteen *Scopelosoma satellitia,* some of the latter being very fair specimens. On the 18th I went a third time, but it turned out horribly cold, and one *Anisopteryx æscularia* was the only insect seen. On the 26th it was again beautifully warm and fine, and a walk to Chislehurst in the afternoon produced nine *A. æscularia* and one *Hybernia progemmaria.* A crippled specimen of *Amphidasys prodromaria* was bred. *Xylocampa lithorhiza* and *Cerastis vaccinii* were the only insects noticed at Bexley on the 29th. *Smerinthus populi, Notodonta trepida, Halias prasinana, Asphalia ridens, Amphidasys betularia,* and *Lomaspilis marginata* emerged during the month from pupæ kept in a warm room.

Common larvæ swarmed in the hedges during May. Imagines were, however, scarce till nearly the end of the month. On the 3rd I went down to Orpington for about two hours, walking from there to Chelsfield railway station. Tiny "loops" were abundant, *Uropteryx sambucaria, Abraxas grossulariata, Cheimatobia brumata, Hybernia aurantiaria,* and *Physelia oxyacanthæ* being noticed. On the 7th we took another afternoon walk to Chislehurst and Paul's Cray, obtaining *Drepana falcataria* and larvæ of *Cerastis vaccinii, Orthosia lota, Xanthia cerago,* and *Hypsipetes elutata.* Larvæ of *Arctia caia* and *Abraxas grossulariata* were now abundant in the garden. On the afternoon of the 24th my sister and I walked to Chislehurst, taking *Tephrosia punctulata* and larvæ of *Orthosia lota.* The 28th I spent at Hayes, Keston, and West Wickham. The weather looked very unpromising when we started, but about 10.30 the sun came out, and it became beautifully warm. Palings yielded *Tephrosia crepuscularia* (*? biundularia*), *T. punctulata, Anticlea derivata,* and *Hadena genistæ,* one of the latter having the hot sun full on it. *Fidonia atomaria* was very abundant, especially on West Wickham Common. A very fine male of *F. piniaria* was beaten from pine, and *Cilix spinula* (*glaucata*) from hawthorn. Larvæ were abundant, and included the following: *Oporabia dilutata, Himera pennaria, Hemithea thymiaria, Rumia luteolata, Epunda viminalis,* and many others. We were rather surprised at taking one larva of *Eupithecia sobrinata* on the only juniper seen, a very small bush.

Our old collecting ground at Bexley was visited on June 4th. *Euchloë cardamines* (male), *Argynnis euphrosyne, Lycæna argiolus* (worn), *Pieris brassicæ, P. rapæ,* and *P. napi* were seen; and about 7 p.m., at a small place which consists of a "pub" and a few cottages, and rejoices in the name of Puddle Dock, two specimens of *Cynthia* (*Vanessa*) *cardui* were careering madly round a haystack, more wily than ever in their old age. Turning to the moths, a specimen of *Spilosoma mendica* was beaten from oak, and a few *Ephyra punctaria* and one *E. porata* from birch. *Tephrosia punctulata* (oak-trunks), *Melanippe montanata,* and *Cidaria corylata* (one) were noticed, whilst *Venilia maculata* was flying freely in the sunshine. *Asthena candidata* was very abundant on the borders of the wood at dusk. Treacle only produced *Gonoptera libatrix* (three) and one *Dipterygia pinastri.* A most enjoyable week-end at Shoreham (June 10th to 11th) was our next expedition. A male *Euchloë cardamines* was seen immediately on leaving the station. The three Pierids, *Cœnonymyha pamphilus, Lycæna icarus, Hesperia sylvanus, H. thaumas,* and *Syrichthus malvæ* were all more or less plentiful. A few *Thecla rubi* and one *Lycæna alsus* were also seen. Among a host of commoner moths *Bapta taminata* was beaten in some numbers, and was much more plentiful than *B. temerata. Fidonia piniaria, Thera variata, Larentia pectinitaria,* &c., were also taken. On the 11th a rather curious thing happened. Whilst my father was beating a yew-tree, he saw something drop which he at first thought to be a pebble, but on picking it up he found it was an egg of the gold-crest; the nest was discovered neatly attached to the under side of the bough; but what astonished us was that the egg did not break, or even crack, though it fell some six feet. On arriving at an uncultivated grassy field surrounded by woods, *Thecla rubi* was seen flitting over the blackthorns. Presently a small Noctua started up, but owing to the wind I had some difficulty in netting it; however, I was rewarded with a specimen of *Acontia luctuosa*. I searched for some time in vain for others, but, meanwhile, my father and other members of the party found it plentiful on the sheltered side of the field, and twenty were taken in about half an hour. *Emmelesia decolorata*, *Cidaria russata*, *Agrotis exclamationis*, *Hadena dentina*, *H. genistæ*, and *Euclidia mi* were also taken. Of larvæ, *Iodis vernaria*, of which we took ten, was the best. As there is a tremendous quantity of *Clematis vitalba* all round Shoreham, this insect should be common: the larvæ were scattered over a rather large area. Treacle produced *Grammesia trigrammica*, *Miana strigilis*, *Apamea basilinea*, *Agrotis exclamationis*, *A. corticea*, *Hadena genistæ*, and a good female *Selenia lunaria*. In the station, a fine female *Bombyx rubi*, also *Dipterygia pinastri* and *Apamea basilinea* were taken at the lamp. We failed to find any other *B. rubi*, though my father had observed the males flying in profusion at Shoreham in 1897.

On July 4th, while treacling in the garden at Lee, I was surprised to see an enormous moth on the treacle, which proved to be a female *Cossus ligniperda*. I had never taken this insect before, and had always understood that it was seldom taken in the perfect state. A fortnight later, however, a second specimen was taken, flying round a poplar-tree in the garden. The larva has been unpleasantly abundant in a garden in Lee, where every tree was full of them, and the smell was terrific. They also attacked the fence to such an extent that a fresh one has been put up. Other insects taken at treacle at Lee during July were *Leucania impura*, *L. lithargyria*, *Miana strigilis* var. *æthiops*, *Xylophasia lithoxylea*, *X. polyodon*, *Diptergyia pinastri*, *Agrotis exclamationis*, *Apamea ophiogramma*, *A. didyma*, *Mamestra brassicæ*, *M. persicariæ*, *Hadena oleracea*, *Triphæna pronuba*, *Cosmia affinis*, *Euplexia lucipara*, *Nænia typica*, *Amphipyra tragopogonis*, *Mania maura* and *Acronycta megacephala*. Of moths taken by other means, single specimens of *Smerinthus populi* (July 26th), *Leucoma salicis*, *Phibalapteryx tersata*, and *Triphæna fimbria* were the principal ones. I have never seen the last named in Lee before; it was taken by Mr. J. Wilson, in his garden, at rest on an elm-tree. Larvæ of *Smerinthus populi*, *S. tiliæ*, *Cerura vinula*, and *Acronycta megacephala* turned up as usual. Of butterflies, *Vanessa atalanta* favoured us in large numbers, and several *Cynthia* (*Vanessa*) *cardui* and one *V. io* were also seen. We spent the evening of July 6th at Bexley. *Nola strigula* was taken on a tree-trunk, *Hepialus hectus* at dusk, and *Aplecta nebulosa* at treacle. Ten days later we travelled to the same locality for the afternoon, my father staying for the evening. Beating produced ten *Calligenia miniata*, and single specimens of *Lithosia lurideola*, *Limacodes testudo*, and *Lophopteryx camelina*; also larvæ of *Ligdia adustata* and *Ennomos fuscantaria* (one). Among other things at dusk, *Pericallia syringaria*, and a brown-suffused specimen of *Hypsipetes elutata* were taken. Treacle at Paul's Cray, on July 9th, produced *Lithosia complana* (one), *H. elutata*, *Noctua baia*, and *Hydræcia nictitans*.

The additions to the Lee insects during August were *Lycæna icarus*, *Orgyia antiqua*, *Pelurga comitata*, *Miana furuncula*, *Triphæna ianthina*, *Catocala nupta*, *Hadena chenopodii*, and *Phlogophora meticulosa*. Larvæ of *Spilosoma lubricipeda*, *Phalera bucephala*. and *Acronycta aceris* were noticed. Some friends who spent Aug. 7th at Shoreham took, among other things, *Hesperia comma* (in beautiful condition), *Melanargia galatea*, *Argynnis aglaia*, *Lycæna corydon*, and *L. medon* (one).

Autumn collecting has been practically nil, *Ennomos tiliaria* has been seen at a street-lamp on Sydenham Hill, and I saw a full-grown larva of *Vanessa atalanta* at Lee on Sept. 23rd.

During October *Oporabia dilutata* is the only moth I noticed.

Chesias spartiata began coming out indoors on Sept. 25th, and kept on till Oct. 18th; *Cerastis vaccinii*, Aug. 23rd till Sept. 9th; and *Orthosia lota*, Sept. 9th to 27th. Surely the *C vaccinii* were rather early, even for bred specimens, especially as they were kept under the same conditions as the other two species, in a room facing north, with no artificial heat.

A great many more insects were bred during the season, and taking it all round it has been one of the most enjoyable I have experienced.

Some Corrections.—I must apologize for the following mistakes:—Entom. xxxi. p. 295, line 10, *Thera juniperata* should be *T. variata* var. *obeliscata*; p. 296, line 8, *Lithosia griseola* and var. *stramineola* should be *Lithosia helveola* (males); line 10 (females). Entom. xxxii. p. 277, line 14 from bottom of page, delete *A. ophiogramma*. I am exceedingly sorry for having recorded the above without previously making their identification certain.—J. M. B. Carr; 46, Handen Road, Lee, S.E.

Field Cricket (Gryllus campestris) near Hastings.—Rev. E. N. Bloomfield has sent me a fine specimen of *G. campestris*, perfect except for the antennæ. It was taken in 1899, at Pett, near Hastings, under a slab of wood in a temporary bathing-shed erected on the beach. It betrayed itself by its shrill cry. To judge by the records, this fine insect is seldom taken in England.—W. J. Lucas; Kingston-on-Thames.

Hemerobius limbatus in January.—On Jan. 6th last I beat a single specimen of *H. limbatus* from *Pinus sylvestris* on Esher Common. The earliest noted in 1899 was March 3rd, in the same locality, when it was taken on the wing.—W. J. Lucas; Kingston-on-Thames.

Lepidopterous Eggs on Sallow, &c.—I am much obliged to Miss A. D. Edwards (*ante*, p. 14) and other entomologists, for their assistance in defining the species of the eggs alluded to by me (Entom. xxxii. p. 307). There is no doubt they were those of *Odonestis potatoria*, a very common moth in the neighbourhood of Chester. Miss Edwards accurately described the general position of the eggs, as there was always plenty of long grass immediately below them, upon which the larvæ could feed. I find the description I gave of the caterpillars agrees with that in Wilson's 'Larvæ' (p. 75), allowing for usual differences in the stage of growth.—J. Arkle; Chester.

Sphinx convolvuli at Penarth.—A schoolboy brought me a full-grown larva of *S. convolvuli* on Sept. 1st, 1899. I have also captured three specimens of this beautiful moth at Penarth.—T. L. Howe.

Acherontia atropos at Penarth.—Two fine pupæ of *A. atropos* were brought to me by the station-master. They were obtained when digging potatoes on the railway bank, Sept. 12th. I put them in my breeding-cage, and four days after I found one imago had emerged; the other followed two days later on. I did not force them.—T. L. Howe; Beaufort Howe, Penarth.

Catocala nupta in 1899.—Seeing Mr. Colthrup's note on *C. nupta* (*ante*, p. 13), I thought that my own captures of this insect might be of some use. I first took *C. nupta* at sugar in my garden about five years ago. Since then the species has become more and more common. In 1898 I took it as late as Nov. 3rd. Last year I took twenty-four specimens between Aug. 7th and Sept. 15th, although it was less common at Dulwich than usual.—S. A. Blenkarn; Clifton House, East Dulwich Road, S.E., Jan. 7th, 1900.

Captures of Odonata.—I have taken the following dragonflies at various times, and Mr. Lucas has very kindly identified them for me. He also informs me that the first-named has occurred only very infrequently in England. It was found dead, on the library steps, Folkestone, by Mr. S. G. Hills, to whom I am indebted for the specimen:—

Æschna mixta. Folkestone, Oct. 3rd, 1899.

Orthetrum cærulescens. Three males and one female; New Forest, July 4th, 1899.

Sympetrum striolatum. Two specimens; Ramsgate, Sept. 21st, 1899.

Ischnura elegans. Very plentiful; Leatherhead, June 22nd, 1897.

Agrion pulchellum. Ramsgate, July 27th, 1898.—C. W. Colthrup; 127, Barry Road, East Dulwich, S.E., Jan. 12th, 1900.

RECENT LITERATURE.

The Hymenoptera of Suffolk. Part I.—Aculeata. By Claude Morley, F.E.S., &c. Pp. viii, 22; map. Plymouth: James H. Keys. 1899.

The present instalment of Mr. Morley's catalogues of the insects of "that best of entomological counties, Suffolk," according to Wratislaw, whose remark is quoted on the title-page, deals with the Aculeate Hymenoptera. Most of the comparatively few entomologists who have studied this very interesting, but still somewhat neglected group of insects, have collected more or less in this county, from the time of the Rev. William Kirby, who published one of his most important works, the 'Monographia Apum Angliæ,' as long ago as 1802, to the present day.

The Aculeata are not a very extensive group; but out of the three hundred and seventy-four British species recognized by Mr. E. Saunders (our best living authority) in 1896, Mr. Morley is enabled to enumerate no less than two hundred and eighty-two as indigenous to Suffolk, though a glance at the map will show that only a comparatively small portion of the county has yet been explored by hymenopterists. Ten years ago only two hundred and thirty-one species were recorded for the adjoining county of Norfolk. We may quote the entry of one species, taken at random, as an illustration of Mr. Morley's method:—

Dasypida.

1. Hirtipes, *Latr.* Barhamiæ, declivia graminosa frequentans. In floribus etiam *Jacobææ* uterque sexus haud infrequens (Kirby).—

Lowestoft in 1862 (Smith).—Not rare in the Brandon District (Perkins). —One fine ♂ at Mill Heath, Rougham, 7–7–99 (Tuck).

We should like to see similar lists of the insects of all our British counties.

W. F. K.

British Dragonflies (*Odonata*). By W. J. Lucas, B.A., F.E.S. Pp. 1–350, with figures and thirty-seven coloured plates. London: Upcott Gill & Co. 1900. 31s. 6d.

Neuropterists will rejoice at the appearance of this fine work, in which the author, an enthusiastic field naturalist as well as an earnest student, has succeeded in giving us a monograph of this group interesting and useful as well to the tyro as to the more veteran odonatist.

Prefixed by separate lists of the figures and plates, and a table of contents, the book commences with a short general introduction, followed by chapters on the life-history and classification, illustrated by figures showing various stages of the life-history and a figure of that singular hymenopterous parasite on the eggs, *Anagrus incarnatus*.

The classification adopted runs, for the most part, on familiar lines, though not absolutely following any previous system. The author divides the *Odonata* into two "superfamilies;" the first, called Anisopterides, or unequal-winged species, consisting of the families (1) *Libellulidæ*, containing the subfamilies *Libellulinæ* and *Corduliinæ*, and (2) *Æschnidæ*, containing the subfamilies *Gomphinæ*, *Cordulegasterinæ*, and *Æschninæ;* the second superfamily, called Zygopterides, consisting of the species with equal wings and a transversely broad head, forming the single family *Agrionidæ*, containing the subfamilies *Calopteryginæ* and *Agrioninæ*. There are a few changes in specific names, chiefly adopted from Kirby's 'Synonymic Catalogue of the Odonata,' 1890, but those who deprecate change will be glad that the author has not followed Mr. Kirby in every case. The specific name of *Anax formosus*, Lind., is replaced by *A. imperator*, Leach; *Æschna borealis*, Zett., by *Æ. cærulea*, Ström.; *Æ. rufescens*, Lind., by *Æ. isosceles*, Müll.; *Lestes nympha*, Selys, by *L. dryas*, Kirby; and *Pyrrhosoma minium*, Charp., by *P. nymphula*, Sulz.

Chapters iv. and v. are devoted to the nymph and imago stages, and from a scientific point of view are perhaps the most important in the book. Too little attention has been paid by British entomologists generally to the early stages of these insects, and the fine papers by Mr. Cabot are unfortunately not so well-known as they should be. In these chapters, which are copiously illustrated, the diagrams showing the structure and the technical terms used in the book for the various parts are most complete and useful, while the analytical tables should enable any neuropterist to name any imago and even most of the nymphs.

Chapter vi. deals with the genera and species at considerable length. In each case the description is divided by subheadings, which greatly assist the reader in finding any particular portion that may be wanted. These commence with the synonymy, followed by the original description of the insect—the size; a full description of both sexes, and, when necessary, the immature condition; the variation; the nymph; the time of appearance; the habits and the distribution. The descriptions are ample and very clear, and the value of the work is greatly increased by the careful way in which the references are given when quotations are made.

The plates as a whole are excellent, but in some instances the printing of the pterostigma is a little faulty, and in plate xx. the figures of *Calopteryx* are not sufficiently robust. Some of the figures of anal appendages, magnified, are so beautifully done as to make us wish that similar figures of the anal appendages of all the species were given.

Should a new edition, or a supplement, be issued, it would be useful if a few plates were inserted showing the immature condition of the commoner *Agrioninæ*, which, though fully described in the book, are not figured, and are too often a stumbling-block to beginners. Plates also of a few allied species not as yet discovered in the British Isles, but from their distribution not unlikely to occur here—such as *Somatochlora alpestris*, *Æschna affinis*, *Agrion hastulatum*, and a few others—would be useful, and might serve to enrich our fauna by enabling species hitherto undetected to be recognized, in which case our author's gloomy forecast of a decrease in our list would be falsified.

The remaining chapters deal with the reputed species; breeding from the nymph; preparing for the cabinet; addenda; reference to the full titles of books quoted; and a very carefully compiled index.

The book should certainly be in the library of everyone interested in the group, and Mr. Lucas is to be congratulated on having so successfully demonstrated the error of the often expressed idea that a book on British dragonflies could be nothing more than a translation of extracts from De Selys Longchamps' 'Revue des Odonates.'

C. A. B.

V. Bianchi. *Enumeratio operum opusculorumque ad faunam Hemipterorum Heteropterorum Imperii Rossici pertinentem 1798–1897.* (Ann. Mus. Zool. Petersb. 1898 [publ. 1899], pp. 289–323.)

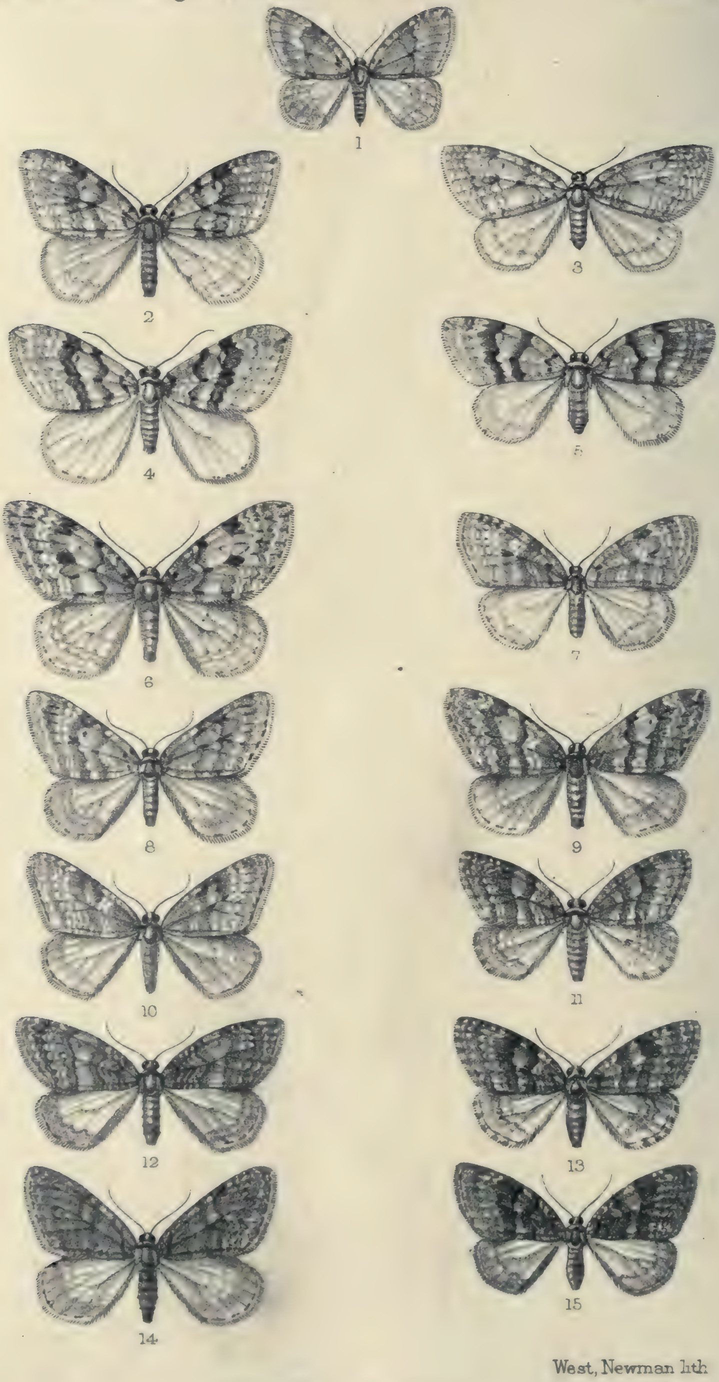
The author has rendered good service to his colleagues by the preparation of this Catalogue, which enumerates the works treating, during the periods included, of the Heteroptera of the Russian Empire. Nearly sixty authors (and about three hundred and fifty works) are recorded, and further help is afforded by a faunistic summary, nineteen divisions being adopted; neighbouring countries (as, for example, Galicia, the Danubian Principalities, and Corea) are also included—placed under smaller headings. It is to be hoped that Dr. Bianchi will prepare a similar catalogue of the works dealing with Homoptera.

G. W. K.

General Index to Miss Ormerod's Reports on Injurious Insects, 1877–1898. By R. Newstead. With Preface by the Author of the Reports. 8vo, pp. 58. London: Simpkin, Marshall & Co. 1899.

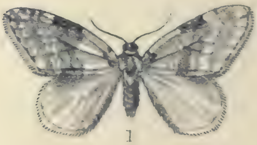
This comprehensive Index will considerably enhance the value of the series of Annual Reports presented to the public by Miss Ormerod during the past twenty-two years. In addition to the index to general subjects, there are also a Plant Index, an Animal Index, and an Index to Unclassified Hosts; these further facilitate reference to the various Reports.

The Entomologist, March. 1900. Plate I.



West, Newman lith.

Oporabia autumnata.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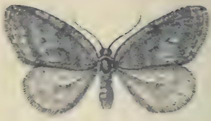
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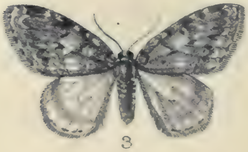
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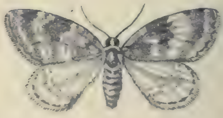
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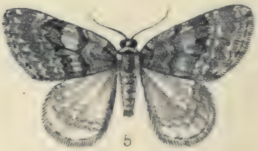
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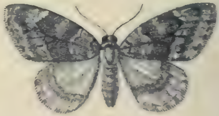
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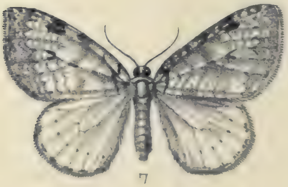
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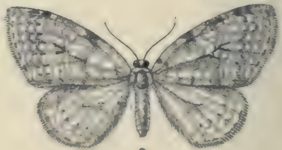
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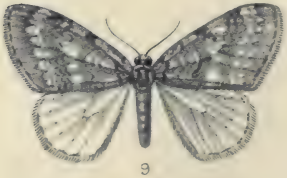
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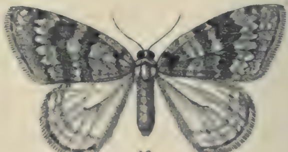
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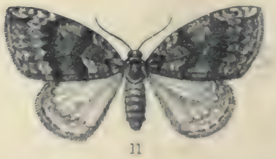
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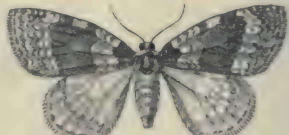
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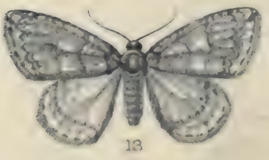
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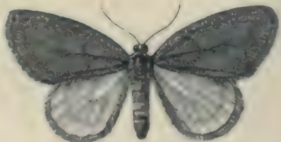
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West, Newman lith.

Oporabia autumnata, filigrammaria, and dilutata.

THE ENTOMOLOGIST

Vol. XXXIII.] MARCH, 1900. [No. 442.

OPORABIA AUTUMNATA FROM RANNOCH, WITH REFERENCE TO SEVERAL OTHER RELATED FORMS.

By Louis B. Prout, F.E.S.

(Plates I. & II.)

Geometra § *nebulata*, Thnb., Diss. i. p. 12 (1784).
G. autumnata, Bork. v. pp. 293, 565 (1794).
? *Phalæna ventilata* (Schneider, N. Cat.), Fb., Ent. Syst. iii. pars 2, p. 191 (1794).
Acidalia dilutata var. **quadrifasciata*, Tr. vi. 2, p. 26 (1828).
Oporabia autumnaria (Dbld., N. Cat.), Weav., Zool. p. 3495 (1852).
O. approximaria, Weav., Zool. p. 3496 (1852).
O. autumnata (Bdv. MS.), Gn., Ur. et Phal. ii. p. 264, No. 1334; Atlas, pl. 18, 7 (1857).
O. filigrammaria varr. *autumnaria* et *approximaria*, Gn., *tom. cit.* p. 265, No. 1335, A et B (1857).
O. autumnaria, Sta., Man. ii. p. 77 (1859).
Cidaria dilutata var. *autumnata*, Stgr., Cat. p. 187, No. 2642, b (1871).
C. filigrammaria ab. *autumnaria*, *loc. cit.* No. 2643, a (1871).
Oporabia addendaria, White, Scot. Nat. iv. p. 160 (1878).
? *O. dilutata pallescens*, Ckll., Ent. xxii. p. 3 (1889).
O. guenéata, Prout, Ent. Rec. x. p. 95 (1898).

The above citations will give a sufficient bibliography of this very interesting though much overlooked species. It is somewhat fortunate that the name *nebulata* was a homonym on its inception, and that thus the generally used name of *autumnata* (-*aria*) is the oldest which is valid.

The present article is written at the instigation of my kind correspondent, Mr. W. M. Christy, of Emsworth, who has been interesting himself in the genus *Oporabia* for the past few years, and has been fortunate in obtaining—partly by capture and partly by breeding—a grand series of *O. autumnata*, of which it is highly desirable that a selection should be figured and discussed. Mr. Christy suggested to me that this would form an appropriate opportunity for clearing up some of the confusion which still exists regarding this species and its allies, and that, as I have been studying them very closely for some time, I should be a suitable person to take the task in hand. This I have great pleasure in doing; and at the same time I am following a further suggestion, both from him and from Mr. South, in figuring, for comparison, some examples of the allied *filigrammaria*, H.-S., and *dilutata*, Bork.

A few preliminary remarks appear necessary in view of the confusion just alluded to. In the first place, I may perhaps be allowed to call attention to the fact that I read before the City of London Entomological Society on May 4th, 1897, a paper on "The Genus *Oporabia*," which was mainly historical, and that the more important parts of this were published in the 'Entomologist's Record' for 1897, pp. 247, 282, and 315. Readers who want to see a summary of the writings and opinions of Doubleday, Weaver, Gregson, Stainton, and others should consult that paper. After further investigations, I sent to the 'Entomologist's Record' for April, 1898 (vol. x. p. 93), a supplementary note, in which I showed that the *autumnaria* of our English writers was also indisputably the *autumnata* of Borkhausen, and left the question open whether *autumnata*, Gn., No. 1334, was or was not a form of the same species; proposing for this last the provisional name of *gueneata*, in order to avoid collision with *autumnata*, Bork. I have since worked out the life-history of *O. autumnata*, my good friend Mr. A. Horne, of Aberdeen, having kindly supplied me with eggs in the first instance, while the results arrived at were further verified in 1899 upon eggs supplied by Mr. Christy, and by Mr. J. E. R. Allen, of Enniskillen, who is also following up this species with interest, and to whom my thanks are due for much valuable information. I wrote an exhaustive paper on the life-history of the species, and read it at a meeting of the City of London Entomological Society last spring; as this will shortly appear in their 'Transactions,' I need not go into the subject here, but will merely indicate as concisely as possible the most important results of my voluminous notes, my hardly less voluminous correspondence, my omnivorous reading of the literature of the genus, and my study of material in such collections as the old Stephensian collection at Cromwell Road, the Doubleday collection, the Zeller collection, those of Messrs. J. H. Leech, Sidney Webb, W. M. Christy, J. E. R. Allen, and others.

In the first place, I can positively assert that there are two totally distinct species of *Oporabia*, both common in Northern and Central Europe, which are nearly always confused as one, notwithstanding their great structural differences. There is also a third form, which may be termed a "sub-species," which deserves to be kept carefully distinct from the others by the systematist, though not differing structurally from No. 2. I will return to this third form when I have differentiated the two indisputably valid species :—

No. 1.—*Dilutata*, Bork.	No. 2.—*Autumnata*, Bork.
Ova.—Highly polished, hardly perceptibly pitted.	Much less polished, deeply pitted.
Larva.—Never with conspicuous longitudinal yellow striping. Very generally with brown or reddish blotches.	With conspicuous yellow longitudinal lines, though often becoming indistinct in *adult* larva. *Never* with brown or reddish blotches.
Imago.—Male genitalia with a hook on the harpes. Male antennæ decidedly thickened.	Male genitalia with no hook on the harpes. Male antennæ slender.
Ground colour always with a dirty ochreous or brownish tinge.	Ground colour clean white or grey, or even blackish, or with a violet tinge, never ochreous-tinted.
Fore wings not very glossy.	Fore wings very glossy.
"Elbowed line" rarely angulated near the costa.	"Elbowed line" nearly always angulated near the costa.

I have omitted in this tabulation a large number of less important points, which are nevertheless very interesting to the close student of these species.

The third principal form is our moorland *filigrammaria*, and though this is such a specialized race that nearly all entomologists can easily distinguish it from both Nos. 1 and 2 of the above, even while failing to distinguish No. 2 from No. 1, yet when we come to an analysis of the differential characters we find that it agrees almost precisely with those given for *autumnata* in the tabulation, and those entomologists who are averse to multiplying species may like to sink it as "*autumnata* var. *filigrammaria*." To treat *filigrammaria* as the type and *autumnata* as the variety, as Doubleday ultimately did, is absolutely indefensible on any and every ground; from the bibliographer's point of view, *autumnata*, Bkh., is long prior to *filigrammaria*, H.-S.; while the student of distribution will lay more emphasis on the fact that, whereas *autumnata* is widely distributed through a great part of the palæarctic region, *filigrammaria* seems to be restricted to a few limited moorland and mountain localities in certain parts of the British Isles.

The chief differences between *autumnata* and *filigrammaria* are the smaller size of the latter, its differently shaped female (the fore wings more cut off at the anal angle), its generally browner tone (hardly ever with really white forms) and its usually sharper markings, particularly the somewhat better defined submarginal band on both pairs of wings—see especially Plate II. fig. 6. It also generally appears earlier in the season (August to early September), but *autumnata* fluctuates greatly in this respect. But, as Mr. South remarked to me in conversation on the subject, some of these distinctions are closely paralleled by those observable between *Hypsipetes sordidata* (*furcata*, Thnb.) and its bilberry variety, to the latter of which specific rank has never been accorded. It is only right to add that the forms from the Isle of Lewis appear somewhat intermediate between *autumnata* and *filigrammaria*, and Mr. Christy has a similar form from Argyllshire.

A few further points of interest will be brought out when we come to the consideration of the specimens figured. I may say that, although seventeen of the twenty-nine were taken or bred by Mr. Christy, and two others were reared from ova with which he kindly supplied me, I myself am entirely responsible for the selection of the specimens which are figured. It has not been easy to choose from amongst the many beautiful and interesting forms of *autumnata* which Mr. Christy has lent me, and I should have liked to devote both the plates to these, but for the desirability of showing a number of forms of its allies for comparison. Plate I. contains nothing but *autumnata*, all being Rannoch examples; Plate II. shows two more *autumnata*, four *filigrammaria*, and eight *dilutata*.

Up to the present, I believe that *O. autumnata* has only twice ostensibly been figured, namely, in Westwood's Supplement to Wood's 'Index Entomologicus,' at fig. 1727, and in Guenée's 'Atlas,' pl. 18, fig. 7. The former figure is very satisfactory, the latter somewhat the reverse, and ruined in many copies by the chemical change which has taken place in the whitish ground colour. Newman's "pale variety of this common moth" (*dilutata*) is apparently in reality an *autumnata*, probably also Freyer's pl. 426, 2 (likewise a supposed aberration of *dilutata*), is really a strange form of this very variable species. I ought further to mention an interesting plate (Ent. Rec. vii. pl. iii.), by my friend Mr. J. A. Clark, of Rannoch specimens, unfortunately figured and described as *filigrammaria*, but unquestionably referable to *autumnata*. It has remained to Mr. Christy to first furnish the material for a plate of examples called by their right name, and such should certainly be of great use to our working lepidopterists.

Plate I. figs. 2 and 3 represent the type forms of *autumnata*, Bkh., and are practically the same form which the German entomologists send out as "*dilutata* var. *autumnata*, Gn." Fig. 2, the male, has the groups of lines (two and three respectively) which traverse the fore wings almost united into bands; fig. 3, the female, has them a little weaker than usual, and the precise type-form would stand just mid-way between these two figures. The hind wings also, in the German type, are often as devoid of markings as in fig. 4. As a matter of fact, the true *autumnata*, Gn., is a somewhat different form, and I have not seen any exactly like it from anywhere excepting Central France, where, curiously, it hardly varies at all, as Guenée says. Until quite lately I had only seen the four worn examples which Doubleday received from Guenée, but the other day, when I was looking through Mr. Leech's series of *dilutata*, I detected several nice examples of the same form; it is very interesting, as showing a specialized local race in that district, that I kept pointing to the examples scattered in this series, and saying "that is like the French form," and "that is another," and each time, on looking at the label, finding "Central France" given as the locality. Under these circumstances, I retain *gueneata* as a varietal name for *autumnata*, Bkh. It may be roughly indicated as a combination of the characters of Plate I. figs. 3 and 6 and Plate II. fig. 1—the white ground colour and weakness of bands of the first-named, the paucity of markings of Plate II. fig. 1, with the general *character* of markings of Plate I. fig. 6—*i. e.* the transverse bands strongly and coarsely dark-marked on the costa and the central nervure.

Figs. 2 and 3 are both captured specimens, the former taken at the end of September, 1897, the latter in early October, 1898. Figs. 4 and 5 show a more extreme development of the tendency shown in fig. 2, and the bands can here no longer be described as consisting of lines at all, but are veritable dark bars. This handsome form was named *nebulata* var. *sandbergi* by Lampa (Ent. Tids. vi. p. 111), who believed it to be a variety of the species usually called *dilutata*; we may also cite here, as a synonym, Clark's *filigrammaria* ab. *virgata* (Ent. Rec. vii. pl. iii. figs. 9–10), and may regard Wood's figure of *autumnaria* (fig. 1727) as representing somewhat the same. I bred the two examples which we are figuring, together with four others equally striking, in a small brood reared from a worn pale female which Mr. Christy sent me last autumn. The male figured emerged on July 30th, 1899, the female on Sept. 27th, the last of the batch not until Nov. 14th!

The rest of the figures on Plate I. show varieties of all kinds, and are very difficult to classify. Without pretending to have arranged them in any very systematic way, I may call attention to the placing of the darkest specimens at the bottom, and, on the whole, the most strongly banded ones on the right-hand side. The notes which follow will bring out the chief points of interest.

In 1898 Mr. Christy bred a very variable and interesting series (though mostly somewhat undersized) from mixed ova obtained at Rannoch in 1897. Of these we are figuring three. Plate I. fig. 1 is unique as far as our material goes, the abnormal broadening and shortening of the fore wings having resulted in the reduction of the central area to an extreme degree. I have seen a figure of a parallel form of *Melanippe fluctuata* by Wiskott, in 'Iris,' x. 393, pl. xii. fig. 12, and it occasionally exhibits itself in other species. Fig. 15 is the darkest bred on that occasion, and one of the darkest I have seen; the transverse bands are, however, fairly well marked, and are unusually broad, with the space between them narrow. The specimen is intermediate between the aberrations *obscurata* (Plate I. fig. 13) and *schneideri* (Plate II. fig. 2), as described by Lampa. Plate II., fig. 1, is also very interesting; it seems to be extremely rarely that *autumnata* produces specimens in which the central area shows any definite approach to the single-banded type of markings which I describe as "carpet" banded, as it is normal in such genera as *Melanippe*, *Coremia*, &c.; *filigrammaria*, on the other hand, very frequently has well-marked carpet band in the female (Plate II. fig. 6).

Plate I. fig. 12 shows a darkened specimen in which the transverse bands are but little more strongly expressed than the numerous other waved transverse lines; this form is the *filigrammaria* ab. *typica* of Clark (Ent. Rec. vii. p. 289). The specimen was taken at large in 1898.

In 1899 Mr. Christy bred four broods from eggs, keeping them carefully distinct, and the specimens obtained show rather curious results in the matter of the influence of heredity; the parent females were taken wild in 1898. One parent was a striking specimen with slightly darkened ground colour, and two unusually narrow very dark bands, rather widely separated. From this twenty-seven moths were bred, not one of which followed the parent form very closely; they varied greatly, though all were of medium colour or dark, some having more or less distinct bands (Plate I. figs. 9, 11, and 13), others quite the reverse (Plate I. figs. 10 and 14). Plate I. fig. 13 is perhaps the most striking; it is unusual to find a melanic specimen with the bands so very well pronounced.

A second 1898 female was much like the example figured at Plate I. fig. 7—one of her progeny; the whole brood of fifteen specimens (seven males, eight females) follow the parent very closely, and hardly vary at all—a great contrast in this respect to the brood last noticed.

A third female was paler, nearly but not quite as white as the type form (Plate I. fig. 3). Thirteen specimens were bred from her, and they again vary exceedingly, some being quite light, others quite melanic; while some have the bands much better expressed than others. Plate I. fig. 8, and Plate II. fig. 2, show two extremes of this brood; the latter is practically without markings, and were it not for the tone of colour and the intensely glossy appearance it could hardly be distinguished from an extreme melanic *dilutata* (*e.g.* Plate II. fig. 14).

The fourth female from which any specimens were bred was the one figured on Plate I. fig. 12 (ab. *typica*, Clark), but as only three emerged it would be rash to generalise from them ; all the three agree pretty well together, being rather weakly marked, and rather paler than the parent, which they do not in any respect incline to follow at all closely.

The very fine large male figured on Plate I. fig. 6 was taken at Rannoch in 1897 ; those who hesitate to acknowledge *filigrammaria* as a form worth keeping distinct from *autumnata* should consider such specimens as this before deciding to abandon the latter name. It would only increase the confusion which already exists to begin to write of these great woodland forms as "*filigrammaria.*" There is an unnamed *Oporabia* species from Esquimalt in our National Collection, of which this specimen much reminds me in the rugged appearance of its markings.

The examples of *filigrammaria* and of *dilutata* figured on Plate II. may to a large extent be left to speak for themselves. Figs. 3, 5, and 6 were all bred by me from the same female, from Bolton ; fig. 6 is Herrich-Schæffer's type form of *filigrammaria*, fig. 4 a female aberration ; figs. 3 and 5 (the latter bred by me in 1899 from Huddersfield ova) represent two fairly representative males, and may be useful for comparison with some of the *autumnata* males.

Figs. 7 and 8 show the male and female of a form of *dilutata* which has interested me immensely, and for which I have proposed (Ent. Rec. xi. p. 122) the name of ab. (? var.) *christyi*. Mr. Christy brought ten of the form (eight males, two females) from a birch wood at Rannoch in 1897, including the male which is figured ; and eight more (four males, four females) in 1898, including the figured female. Except that four of the 1897 specimens (three males, one female) were slightly infuscated, the form hardly varies appreciably, and it is in many respects so closely parallel to Guenée's *autumnata* (var. *gueneata*, mihi), especially to his *figure* (Atlas, pl. 18, fig. 7), that for a long while it greatly mystified me. The respects in which it agrees with *autumnata* var. *gueneata* are:—

1st. The comparative absence of sexual dimorphism, and the approximately equal size of the sexes.

2nd. The weakness of the markings, except at the costa and on the nervures.

3rd. The tendency to angulation of the "elbowed line" (extremely rare in ordinary *dilutata*).

4th. Its attachment to birch.

The proofs, however, that it is *not* a form of *autumnata* are :—

1st. The male genitalia agree with those of *dilutata*.

2nd. The ground colour has somewhat of the dirty yellowish tinge which is wanting in *autumnata*.

3rd. The egg is apparently even *more* highly polished and brightly orange-tinted than typical *dilutata*, instead of much *less* so, as in *autumnata*.

4th. The larva often has reddish dorsal blotches.

Unfortunately neither of us has yet succeeded in breeding this form right through, though fertile ova have been obtained; at one time I fancied it might be a distinct species. As stated in the 'Entomologist's Record' (*loc. cit.*), Doubleday was also puzzled by the resemblance of "*christyi*" to *gueneata*, for he has left specimens of it in his collection labelled "*autumnata?*" (i. e. *autumnata*, Gn. ?).

Ab. *christyi* also has a remarkably small central spot—often practically obsolete; whereas the normal Scotch *dilutata* (figs. 9 and 10) has the central spot well developed, in the female often opened out into a small ring (as in the ab. *inscriptata* of Donovan).

Plate II. fig. 11 was bred from Glasgow, and shows the true ab. *obscurata* of Staudinger. Fig. 14 is even more extreme, and is my ab. *melana* (Ent. Rec. xi. p. 122); it was bred from a Chingford larva.

Plate II. fig. 12 is a handsome female, which I believe came from Wheeler's collection, and represents the form which I call "carpet banded" (ab. *latifasciata*, mihi). The remaining figure (fig. 13) is interesting as having been bred from Chingford, where these pale forms are of extremely rare occurrence; it may be profitably used for comparison with the equally pale ab. *christyi* (Plate II. fig. 8), and with the pale type of *autumnata* (Plate I. fig. 3), from both of which it differs materially, though perhaps the actual specimens need to be seen in order that the differences in *tone* may be fully realized.

In conclusion, I should like to urge our entomologists, especially those residing in the north, to make a careful study of this fascinating genus; and to say how pleased I shall be to determine their specimens, or render any assistance in my power.

EXPLANATION OF PLATES.

PLATE I.

FIG.			
1.	*Oporabia*	*autumnata*,	♀ abnormity (bred 1898).
2–3.	,,	,,	Bkh., type, ♂ ♀ (1897, 1898).
4–5.	,,	,,	ab. *sandbergi*, ♂ ♀ (bred 1899).
6.	,,	,,	ab. ♂ (1897).
7–11.	,,	,,	varied forms (bred 1899).
12.	,,	,,	ab. *typica*, ♀ (1898).
13.	,,	,,	ab. *obscurata*, ♀ (bred 1899).
14–15.	,,	,,	other dark aberrations, ♂ ♀ (bred 1899, 1898).

PLATE II.

FIG.	
1.	*Oporabia autumnata*, ab. ♂ (bred 1898).
2.	,, ,, ab. *schneideri*, ♀ (bred 1899).
3–4.	*Oporabia filigrammaria*, ♂ ♀ (bred 1897, Bolton).
5.	,, ,, ♂ (bred 1899, Huddersfield).
6.	,, ,, type, ♀ (bred 1897, Bolton).
7–8.	*Oporabia dilutata* ab. *christyi*, ♂ ♀ (Rannoch, 1897, 1898).
9–10.	,, ,, ♂ ♀ (Aberdeen, 1893).
11.	,, ,, ab. *obscurata*, ♀ (bred 1898, Glasgow).
12.	,, ,, ab. *latifasciata*, ♀ (? Norfolk).
13.	,, ,, pale ♀ (bred 1896, Chingford).
14.	,, ,, ab. *melana*, ♀ (bred, Chingford).

NEW INSECTS FROM ARIZONA, AND A NEW BEE FROM MEXICO.

By T. D. A. Cockerell, N.M. Agr. Exp. Sta.

The following insects were taken on a recent trip to Arizona; the main result of the trip will be set forth in a Bulletin of the Arizona Experiment Station, but it is thought expedient to present the descriptions of the new species in an entomological journal. The *Perdita* from Juarez was taken on the same trip, and so is included.

Apidæ.

Perdita baccharidis, sp. n.

♀. Length not quite 6 millim.; head and thorax dark green, with yellow markings; abdomen banded. Cheeks hairy, but face nearly bare; front and vertex strongly granular; frontal fovea elongate; maxillary palpi 6-jointed; labial palpi 4-jointed, the first joint not greatly longer than the other three together; flagellum dark brown above, except at apex, yellow beneath; scape yellow, with a dark spot at apex; mandibles yellow, the tips rufous; labrum yellow, a dark mark at base; clypeus yellow, the usual dots small and very near the margin; supraclypeal mark well-developed, a little more than semicircular; no dog-ear marks; lateral marks broad below, ending at a point above, angulate opposite the antennal sockets, owing to the interference of the fovea. Mesothorax almost entirely nude, very shiny, with distinct but very sparse punctures; pleura all dark; prothorax, except a subtriangular lateral area, entirely yellow; tegulæ hyaline, with a yellow spot; wings perfectly hyaline, nervures very pale brownish, subcostal nervure and margin of stigma rather dark: stigma hyaline; marginal cell almost squarely truncate, the substigmatal portion a trifle longer than the poststigmatal; second submarginal narrower fully one half to marginal; third discoidal distinct. Femora all yellow; anterior legs entirely yellow; middle tibiæ dark brown on the outer side; hind tibiæ and tarsi entirely dark brown; claws cleft. Abdomen yellow, with four broad dark brown bands, about as broad as the intervals between them; basal part of first segment mostly dark;

hind margin of fifth segment darkened; venter yellow. The abdominal bands do not unite on the lateral margins.

Hab. Tempe, Arizona, Oct. 28th, 1899 (*Ckll.*). Two females at flowers of *Baccharis* at the foot of Tempe butte. The types are unfortunately somewhat discoloured by cyanide.

Allied very closely to *P. townsendi*, but differs by its smaller size, nude or nearly nude mesothorax, and the entire supraclypeal mark. From *P. stottleri* it differs by its entirely yellow femora, the entire supraclypeal mark, and the marginal cell less obliquely truncate. From *P. bigeloviæ* it differs by the yellow femora, shape of face-marks, &c.; from *P. zebrata* by the details of the face-marks, markings of the legs, &c.

This insect finds no place in Mr. Ashmead's generic tables, having the mouth-parts of *Perdita*, with the abdominal markings of *Neoperdita*.

Perdita mellina, sp. n.

♂. Length about 4½ millim.; head and thorax very dark green, almost black; metathorax dark blue; abdomen brownish orange, the first two segments strongly suffused with black. Labial palpi with the first joint longer than in typical *Perdita*; clypeus with the median (upper) portion small and hemispherical; clypeus, labrum, lateral face-marks, and dog-ear marks, yellowish white or very pale yellowish; no supraclypeal mark; lateral marks nearly equilateral triangles, with the upper angle at the level of the antennal sockets; mandibles white, with dark tips; cheeks simple, the extreme lower part white; face moderately hairy; head large, subquadrate; antennæ yellow beneath, yellowish brown above; vertex shining, minutely and obscurely granular; mesothorax shiny, fairly pubescent; tubercles, and two transverse marks on upper border of prothorax, cream-colour; pleura entirely dark; wings slightly milky, iridescent; nervures and stigma yellowish white; marginal cell fairly long, nearly squarely truncate; second recurrent nervure rudimentary; femora black, with yellow ends; tibiæ yellow, the hind tibiæ suffused with blackish; tarsi yellowish white; abdomen rather short and broad, hairy at tip, venter immaculate.

Hab. One at flowers of *Heterotheca subaxillaris*, Phœnix, Arizona, Oct. 15th, 1899 (*Ckll.*). *P. mellina* differs from *P. chamæsarachæ* by the smooth front, differently-shaped clypeus, &c.; from *P. sidæ* by the colour of the abdomen, shorter marginal cell, &c.; from *P. semicrocea* by the colour of head and thorax, rather longer marginal cell, &c.; from *P. rhodura* by the pale nervures, dark femora, colour and markings of head, &c.

Perdita heterothecæ, sp. n.

♀. Length about 4½ millim.; head and thorax black, with a metallic lustre; mesothorax rather brassy, metathorax bluish; head ordinary, cheeks and occiput with abundant white hair, face hairy at sides; mandibles yellowish white, with ferruginous tips; labial palpi with the first joint longer than the other three combined, but not twice as long; clypeus (except the usual dots, which are very near the margin) and lateral face-marks dull white, the latter triangular, with the upper angle on the orbital margin about on a level with the antennal sockets; no supraclypeal or dog-ear marks; antennæ dark brown above (yellowish brown towards the tips), yellowish beneath; vertex minutely granular, but still shiny; mesothorax shining, sparsely punctured, rather hairy; tubercles, and two transverse marks on hind border of prothorax, white; wings opaline, nervures colourless, stigma faintly yellowish, marginal cell moderately long, nearly squarely truncate; second submarginal large, narrowed at least one-half to marginal; third discoidal distinct. Femora black, knees light; tibiæ (very hairy) dark brown or black, anterior tibiæ cream-colour in front; tarsi yellowish white. Abdomen broad and flat, very dark brown, with straight yellowish white bands at extreme bases of segments 2 to 4, each band with a linear median interruption, the bands all abruptly ending some distance before the lateral margins. The band on the fourth segment is absent in one specimen. Tip of abdomen hairy, pygidial plate long, orange-brown; venter dark brown, the margins of the segments hyaline.

♂. Like the female, but there is a minute supraclypeal mark, and the abdomen is hardly so dark, while the bands are browner and less well defined.

Hab. At flowers of *Heterotheca subaxillaris*, three females, one male, Tempe, Ariz., October, and Phœnix, Ariz., Oct. 15th, 1899 (*Ckll.*). At both places, and on the same flowers, I also took *P. asteris*, Ckll.

P. heterothecæ (♀) is very like *P. ignota*, Ckll., but differs in the shape of the lateral face-marks, and the second submarginal cell less narrowed above.

Perdita heliotropii, sp. n.

♀. Length about 4½ millim.; head and thorax dark brassy green; abdomen lemon-yellow, with four broad entire dark-brown bands. Head ordinary; face almost free from hair, but a good deal of hair above the antennæ; labial palpi, with the last three joints together somewhat more than half the length of the first; vertex strongly granular; labrum dark brown; clypeus, two spots representing the supraclypeal mark, and lateral marks, pale lemon-yellow; no dog-ear marks; clypeus with the usual dots, and also two brown spots on its upper portion; lateral face-marks narrow, tapering to a point a little above the level of the antennal sockets, slightly angulate a little before the point; cheeks wholly dark; antennæ dark brown above, yellow beneath; mesothorax shining, with scattered punctures and sparse hairs; tubercles, and both borders of prothorax anteriorly, lemon-yellow; nervures and stigma very pale brown; marginal cell nearly squarely truncate; third discoidal distinct; femora black, with yellow apices; front and middle tibiæ and tarsi yellow; hind tibiæ and tarsi dark brown; venter of abdomen yellow.

♂. Length 4 millim.; labrum yellow; clypeus yellow, without the two brown spots; supraclypeal mark transversely hour-glass-shaped; no dog-ear marks; lateral face-marks ending in an emarginate truncation at about the level of the antennal sockets; first four tibiæ dark behind; abdomen very dark brown, with obscure transverse yellow bands, not reaching the lateral margins, at bases of segments 2 to 4; venter dark brown, becoming pale reddish apically; second recurrent nervure scarcely visible.

Var. *a.* ♂. Upper part of clypeus occupied by a quadrate dark brown patch, emarginate on its lower edge; supraclypeal mark divided into two spots; abdomen with only the bands on the second and third segments, these very obscure, and interrupted in the middle.

Hab. Juarez, State of Chihuahua, Mexico, Oct. 6th, 1899 (*Ckll.*); two females, five males, all at flowers of *Heliotropium curassavicum.* *P. heliotropii* ♀ is close to *P. stottleri*, but smaller, with the light parts of the abdomen much yellower; the male has face-markings a good deal like those of *P. bigeloviæ.*

Hypomaerotera callops, Ckll. & Porter, subsp. nov. *persimilis.*

Both sexes a trifle smaller than the type; female with the spot at the apex of the wings usually distinct. Male with the flagellum clear cream-colour beneath; the legs with the black rather less developed, and the light part of the face slightly tinged with yellow. There is also a well-developed supraclypeal mark, and the marginal cell (male) is considerably shorter than in *callops.* Face not so hairy in male as in type.

Hab. One male at flowers of *Tribulus grandiflorus*, Oct. 7th; many females at flowers of *Physalis*, Oct. 9th. All at Phœnix, Arizona (*Ckll.*). I should hardly separate this on the female, but the male is palpably distinct.

Calliopsis coloradensis coloratipes (Ckll.).

This was described as a variety of *C. flavifrons*, but it is really a subspecies of *C. coloradensis.* The female, not before described, resembles that of *coloradensis*, but is easily distinguished by the clypeus having only two minute dots, instead of two black bars, and by the presence of the dog-ear marks.

Hab. Mesilla Park, N. M., Sept. 1st, at flowers of *Isocoma wrightii*, two males, two females, in cop. (*Ckll.*); Phœnix, Arizona, Oct. 7th, at flowers of *Isocoma hartwegi*, also rolling in the dust, many males and females in cop. (*Ckll.*). Compared with the typical (N. M.) form, the Arizona male has the face-markings yellower, and the female has the dog-ear marks smaller, and the clypeus often with rudimentary bars, thus approaching true *coloradensis.*

Xenoglossa patricia, Ckll., subsp. nov. *angustior.*

♂. A little smaller and less stout, hind legs noticeably smaller and more slender; apical plate of abdomen narrower, and rounded at the tip, like the end of a finger, instead of truncate.

Hab. Buckeye, Arizona, at flowers of *Cucurbita palmata*, October (*Ckll.*).

MUTILLIDÆ.

Sphærophthalma foxi, Ckll. (=*heterochroa*), var. n. *arizonica*.

♀. Similar to the type, but in place of red hair on the head and thorax it is pale ochreous; the scarlet on the second abdominal segment is very vivid. The colour-contrast is very striking, and gives the insect a great superficial resemblance to *S. dugesi*.

Hab. Phœnix, Arizona, Oct. 15th, 1899 (*Ckll.*).

Sphærophthalma heliophila, sp. n.

♀. Length not quite 8 millim., rather slender, ferruginous. Head large, a little wider than thorax, subquadrate seen from in front, but the vertex rounded and large; cheeks ample, rounded, not keeled or spined; eyes small, facetted, slightly oval, very convex; antennal fovæ bounded above by a ridge; mandibles long, the apical half or more black, slender, a well-developed tooth a little beyond the middle; antennæ ferruginous, tips a little darkened, scape bent; punctures of front and vertex strong; upper part of head with scanty appressed shining orange hair, and upright black hairs, some quite long; scape and lower parts of head with scanty white hair. Thorax seen from above pyriform, the dorsal surface rough, becoming reticulate on the hinder part, with the same appressed shining orange hairs, and erect black hairs, as on the head, except that on the metathorax (middle segment) the orange-fulvous hairs are wanting, and there is a median longitudinal band of appressed silver hair. Sides of thorax with very scanty white hair, and a dense band of silver hairs extending from the hind end as far forwards as the middle coxæ. Legs slender, ferruginous, with scanty white hairs; spurs white; tibial and tarsal spines and bristles black. First segment of abdomen small, nodose, constricted at its junction with the second, ornamented above with a broad longitudinal band of dense silver-white hair, basal projections thorn-like seen from above, pyramidal seen from behind; second segment yellowish ferruginous, with strong but sparse punctures, a central oval blackish patch, due to black hairs, connected vaguely with a broad band of black hairs on the hind margin, extreme sides with a band of silvery white; segments 3 to 5 with silvery-white hair in the middle and at the sides, but black in the subdorsal region; apex with black hair; ventral segments 2–4 fringed with white. The tibial spurs are serrated.

Hab. Glendale, Arizona, running on the railroad track, Oct. 31st, 1899 (*Cockerell*).

In Ashmead's table this runs into the restricted genus *Sphærophthalma*. It does not fall exactly in any of Fox's groups; the facetted eyes throw it out of group *occidentalis*, and the serrated spurs out of the three following groups. From the other groups it is excluded by the non-emarginate eyes and the non-tridentate mandibles. It is a pretty species, known by its slender form and the silver-white bands as described.

PHYMATIDÆ.

Macrocephalus arizonicus, sp. n.

♂. Length 8 millim.; breadth of abdomen 4, of scutellum 2¼, length of scutellum 4, breadth of thorax 3½ millim. Entire insect orange-brown, the colour of dried apricots; abdomen somewhat redder; antennæ pale, terminal half of last joint bright green; anterior tibiæ blackish; four hind legs with the coxæ, trochanters, and femora blackish with small white warts, tibiæ pale yellowish, tarsi darker and greenish. Abdomen broad, heart-shaped, the lateral margins visible nearly to the end of the scutellum; thorax with the usual lateral angular projections quite large, and the two longitudinal keels distinct, though concolorous with the rest of the surface; keel on scutellum distinct, reaching the apex, broadened on the basal fifth, but nowhere at all bullate; sides of scutellum presenting the usual gentle double curve; upper surface of head and thorax rough, with minute pallid pimples; hinder part of thorax irregularly and confusedly cancellate; scutellum distinctly cancellate basally, otherwise rough and subcancellate, with innumerable punctures. Antennæ with the first joint stout, cylindrical, a little longer than the third; second short and more or less heart-shaped; third a little longer and more slender; fourth large, larger than the second and third together.

Hab. Tucson, Arizona, in the region of Larrea and Mesquite, Nov. 7th, 1899 (*Ckll.*). Allied to *M. prehensilis*, Fab., and *M. lepidus* Stål. The antennæ are rather like those of *M. pulchellus*, and the colour is nearest to that of *M. inæqualis.*

Phymata salicis, sp. n.

Length 8 to 9 millim.; breadth of abdomen 3½ to 4 millim. Similar in most respects to *P. fasciata*, Gray, but smaller than that species usually is, and narrower, with the frontal process always longer, so that the lateral profile of the face is quite concave. The hinder lateral angle of the thorax is also less prominent, the margin between the lateral angles being almost or quite straight, instead of concave. The colouration is markedly different from that of *fasciata*, being a mixture of very pale yellow and light green, the dark abdominal band merely nebulous, and all the markings suffused. The green becomes quite bright on the middle of the thorax, and on the legs and antennæ; the anterior lateral angles of the thorax are stained with dark fuscous, and the top of the head is in some specimens marked with the same colour.

Hab. Phœnix, Arizona, numerous (♂ ♀) on twigs of *Salix fluviatilis*, preying upon butterflies (*Lycæna*) and flies (*Syritta*), Oct. 7th, 1899 (*Ckll.*). This could be considered a race of *P. fasciata*, but in a long series its characters are perfectly constant, and distinct from those seen in *fasciata*, in the manner described. *P. fasciata* is a flower-inhabiting species, whereas *P. salicis* is adapted for life upon the twigs of the willow.

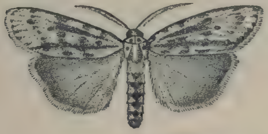
VARIATION OF *EMYDIA CRIBRUM*, L., IN ENGLAND.

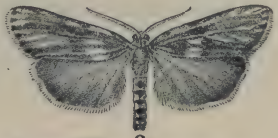
Eulepia cribrum, Curtis, Brit. Ent. ii. pl. lvi. (1825); Stephens, Ill. Brit. Ent. Haust. ii. p. 92 (1829); Stainton, Manual, i. p. 149 (1857); Newman, Brit. Moths, p. 30 (1869).

Emydia cribrum, Boisd., Ind. Meth. p. 39 (1829); Guen. Ind. Meth. p. 56 (1840).

Spiris cribrum, Walker, Cat. Lep. Het. ii. p. 472 (1854).

Coscinia cribraria, Kirby, Cat. Lep. Het. p. 343 (1892).


1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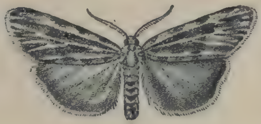
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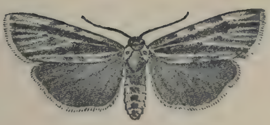
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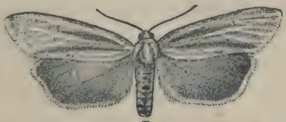
5

Mr. Fowler, of Ringwood, has been good enough to send me, for examination, the whole of his extensive collection of *Emydia cribrum*. The majority of the specimens are from the Ringwood locality, and others are from the New Forest. Although it might possibly be a difficult matter to say from which locality individuals came if all the examples had been mixed together, the two series as arranged show certain differences. The most striking feature of the New Forest contingent appears to be the generally clearer ground colour; whilst among the Ringwood specimens there is a tendency to fuscous suffusion, chiefly in the males, and to greater prominence of the transverse bands and the longitudinal streaks in both sexes (figs. 2 and 3 ♂ ♂). Fig. 6 represents a suffused male specimen, but this is not the darkest in the series. In five female examples and one male from the New Forest, and in three females from Ringwood, the transverse markings are only faintly indicated (fig. 5 ♀). Most of the female specimens from the last-named locality are strongly marked (fig. 4), but two examples have the spots rather small (fig. 7). In the large proportion of the specimens, the transverse markings referred to as bands are series of more or less confluent spots, but in several examples the sub-basal, ante-medial, and post-medial bands are entire or almost so (fig. 1). The spots forming the submarginal series are often linear or cuneiform, but rarely round; in some specimens the submarginal spots unite with those of the marginal series, forming internervular streaks (figs. 3 ♂ and 4 ♀). Sometimes the area between the base of the wing and the sub-basal band is blackish (fig. 2 ♂).

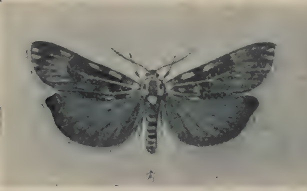

Fig. 6.

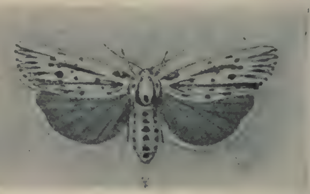

Fig. 7.

Comparing the series of *E. cribrum* under consideration with continental representatives of the species, I find that the English specimens differ from all foreign examples that I have seen in the matter of the longitudinal streaks. None of the continental specimens in the National Collection at South Kensington, or in Mr. Leech's collection, have these streaks; there is no mention of these characters in the original description, neither does Esper's figure exhibit them. On the other hand, in not one of the one hundred and seventy odd specimens in Mr. Fowler's series are the streaks absent. There is nothing in the variation of the English specimens tending in the direction of var. *candida*, Cyr., beyond the form represented by fig. 5, but the continental named form has white fore wings, and is devoid of marking except two black dots at the outer extremity of the discoidal cell. Some of the suffused specimens from Ringwood approach var. *rippertii*, Boisd., but cannot be correctly referred to that form.

The streaks referred to are certainly not typical of *E. cribrum*, it might therefore be well that the forms in which they are present should have a varietal name, and I would propose *bivittata* as being a suitable one. All the other characters are so exceedingly variable that it would seem to be useless to suggest names for the numerous modifications.

Richard South.

Note.—The antennæ in figs. 1, 2, and 3 have not been correctly drawn; this was, unfortunately, only noticed when too late for alteration.

NOTE ON *ANTHOCHARIS*.

By T. A. Chapman, M.D., F.E.S.

Having obtained a few pupæ of *Anthocharis belemia*, and so had the opportunity of observing the butterfly alive at leisure, I observed one little fact that is probably well known, but may be new to others as it was to me, and is interesting in connection with the protective colouration in the genus. We are all familiar with the green and white spotting of the under side of *A. cardamines* and its nearest allies, and how the insect at rest assimilates closely to white flowers over green foliage both in general and detailed effect. No doubt the flowers contemplated are such white Cruciferæ as *Erysimum alliaria* (garlic mustard), the most frequent food-plant of the species with us, but not at all out of harmony with many Umbelliferæ and other flowers.

The colours are the same in *belemia*, but they are here disposed in irregular stripes crossing the wings at an angle, irregular both as to width and intersection, but still distinct transverse stripes instead of spots. Now my one little fact is, as to the resting attitude of the butterfly, which sits with the wings closed in the usual way, the head close down to the surface in which the butterfly is seated, and the antennæ porrected so as to lie close together and appressed to the resting surface. The abdomen and the inner margin of the hind wings between which it is hidden are raised from the surface at a considerable angle (30°–40°), with the result that the stripes of green and white are exactly parallel in general direction with that surface. Supposing this to be a blade of grass or a petiole of a flower, amongst others all substantially parallel, then the green stripes would accord with these. Someone who has seen the butterfly at home may be able to tell us with what the white stripes agree. Probably the white really agrees with those portions of foliage that strongly reflect light and look white and glistening, the green portions according with the general tone. I should imagine, however, that this insect rests amongst foliage of a spiked or grassy character and not close to the flowers, as in the case of *cardamines*, *belia*, *daplidice*, &c.

In these there is little doubt that the white does refer to the flowers, when we see in *euphenoides*, a species that is attached, I fancy exclusively, to *Biscutella*, with yellow flowers, that the surface that is white in the other species is here yellow.

We can hardly help comparing this case with that of the tiger and the leopard, where striping and spotting are co-related with hiding in grassy jungle and leafy forest, and with the parallel difference in marking between *paphia*, &c.—and *adippe*, &c., which has not, so far as I know, been attributed to any differences as to their preference in hiding-places.

Betula, Reigate: February, 1900.

NOTES ON JAMAICAN RHYNCHOTA.—No. 2.*

By G. W. Kirkaldy, F.E.S

Corrections, &c., to No. 1.

6. *Notonecta undulata*, Say.

It is not this species which comes to "light," but a small *Corixa*, which will be noticed later on.

New localities.—"Rain-water tank, Yardley Chase, Oct. 31st, 1899" (leucochroic forms). Mr. Taylor writes me:—"Owing to the peculiar geological formation of the district there are absolutely no rivers or streams of any kind in the Santa Cruz Mts., the inhabitants depending entirely on rain water for all their needs. For this purpose large tanks are constructed, the water being conveyed from the roofs of the houses and from the 'barbecues'—as the cemented terraces used for drying coffee and pimento are termed—by gutters of various constructions. I did not therefore expect to get any bugs, especially as owing to the severe and protracted drought most of the water supply had been used up, and the tanks were very low in consequence. About a week before my return home, however, the island was visited by a hurricane and series of floods that filled up all the tanks, but wrought incalculable damage to property all over the country. . . . Some idea of the extent of the downpour may be gathered from the fact that a large lake some miles in extent has formed among the mountains to the west of the Santa Cruz range, and at the present moment is increasing to the great consternation of the inhabitants of the surrounding district. In parts this body of water is seventy feet deep. . . . I went the round of the tanks. . . . Some plants (known here as the water hyacinth) have almost entirely covered the whole surface, but a small space of clear water at one end was occupied by quite a large number of Notonectas." (C. B. Taylor, Dec. 5th, 1899, *in litt.*)†

9. "*Trochopus plumbeus* (Uhler)" = *marinus*, Carpenter.

This species was included on the authority of Mr. Carpenter's description. Since writing the first note I have examined the types of Prof. Uhler's and Mr. Carpenter's insects, as well as fresh material sent by Mr. Taylor, which confirms my opinion expressed in the 'Bolletino Mus. Torino,' xiv. No. 350, pp. 5–6 (1899), *viz.* that *Trochopus* is not generically distinct from *Rhagovelia.*

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* See "On some Aquatic Rhynchota from Jamaica," Entom. xxxii. pp. 28–30 (1899).

† I admitted the name "*maculata*" for a var. of *N. undulata* in my revision of the genus (1897, Trans. Ent. Soc. Lond. p. 410): as, however, the name was previously used for a var. of *N. glauca* (p. 419), it must be altered, and I now propose "*selene*." For the cream-coloured forms (head, pronotum, scutellum, elytra, &c.) common in Jamaica, it may be useful to use the name "*albida*."

It may be useful to discuss the matter again briefly, and, first of all, to reproduce a portion of the paper mentioned above, which is possibly not very accessible to British entomologists:—

"The chief differences between *Rhagovelia* and *Trochopus* appear to be (*teste* Carpenter and Champion) that:

"(1) In *Trochopus* the tarsi are (according to these authors) 3, 2, 2-segmentate; in *Rhagovelia* 3, 3, 3.

"(2) The pronotum in *Trochopus* is sutured off from the mesonotum; in *Rhagovelia* (except *R. tenuipes*, Champion, *l. c.* p. 137) these nota are fused together.

"(1) Now I have elsewhere expressed my opinion of the unsatisfactory character of these minute tarsal 'segments.' I think I may say that in average 'good' museum specimens preserved in the ordinary way they are very difficult to observe with any degree of certainty without a certain amount of preparation, which is very undesirable, if not improper, in dealing with borrowed material, especially types, and examination under a compound microscope. The fact that such a careful worker and able entomologist as Mr. Carpenter failed—in working with material preserved in alcohol—in his original description (*l. c.* p. 78) to detect more than two segments in each anterior tarsus shows the undesirability of employing such a character. Moreover, these minute segments (or 'nodes,' as they may preferably be termed) are apparently not always constant in the Gerridæ, for Prof. Uhler, in describing *Trepobates pictus* (Proc. Zool. Soc. Lond. 1894, p. 214), writes:—'In two specimens the basal joint of tarsi was present on one side, and not on the other.'

"(2) The exception to the fused pro- and mesonota (in the apterous *R. tenuipes* female) can scarcely be deemed to prove the rule; indeed, it appears almost to render further discussion unnecessary. Moreover, a species from Venezuela in the Turin Museum, which I have determined as *R. femoralis*, Champion, and another from Venezuela and Darien, referred by me to *R. angustipes*, Uhl., noticed in the first part of this paper), have distinctly separated pro- and mesonota in both sexes, and at the same time there are three distinct (as seen with a compound microscope) segments in each tarsus. In short, *Trochopus* may perhaps be on the way to developing into a new genus or subgenus, but it cannot be said, in my opinion, to have attained as yet to that point."

In examining the material sent by Mr. Taylor from the spot where the original captures were made, differences in the segmentation of the tarsi, similar to those mentioned by Prof.

Uhler in *Trepobates*, are observable in a few examples. In reviewing the subject, I have little hesitation in writing "*Trochopus*" as a synonym of "*Rhagovelia*," and the Jamaican species as:

Rhagovelia plumbea, Uhler = *Trochopus marinus*, Carpenter = *Taochopus plumbeus* (Uhler), Carp. and Champ.

New locality.—Rock Fort, St. Andrew (*C. B. Taylor*).

ADDITIONS TO THE AQUATIC FAUNA.

11. *Corixa kollarii*, Fieber.

I recorded this species doubtfully from females in Part I. I can now confirm its presence from specimens sent by Mr. Taylor from Yardley Chase, Santa Cruz Mts., St. Elizabeth (Oct. 31st, 1899); taken at light (*C. B. Taylor*).

12. *Corixa pygmæa*, Fieber.

Same locality as the preceding, and also from Rae Town, Kingston; at light (*C. B. Taylor*). This is the species referred to previously under *N. undulata*.

13. *Anisops pallipes* (Fabr.)

One female from rain-tanks, Yardley Chase (*C. B. Taylor*).

14. *Gerris guerini*, Leth. & Sev. (= *marginatus*, Guer. nec Say).

Macropterous and apterous females and nymphs from (α) Yardley Chase, Southfield District of Santa Cruz Mts., St. Elizabeth (altitude 1500 ft.), Oct. 31st, 1899, from rain-water tank; and (β) Rock Fort Road, St. Andrew, four miles east of Kingston, April 16th, 1892; shallow pool at roadside under limestone bank (*C. B. Taylor*).

15. *Rhagovelia tayloriella*, sp. nov.

Elongate; head above distinctly sulculate [? generic character]. Basal segments of antennæ and the legs with long scattered bristly hairs. First antennal segment one-half longer than second, which is very slightly longer than the third, the latter a *trifle* longer than the fourth. Rostrum reaching to the middle of the mesosternum. Intermediate femora two-fifths longer than tibiæ, not constricted medially; tibiæ subequal to the tarsi, armed with a short straight spine at apex; third tarsal segment one-seventh longer than the second. Posterior femora very slightly longer than the tibiæ, which are nearly three times as long as the tarsi; second tarsal segment three-fifths longer than the first; posterior tibiæ straight. *Macropterous form:* pronotum somewhat obsoletely carinate longitudinally. Long. 5 mill.

♂. Third antennal segment noticeably incrassate; anterior tibiæ considerably dilated (especially towards the apex), and excavated beneath. Posterior femora considerably incrassate, and armed beneath with ten to eleven strong teeth, from the centre to the apex, diminishing regularly in size towards the apex; tibiæ conspicuously denticulate; trochanters denticulate. Sixth (? seventh) abdominal segment greatly depressed beneath on its apical half (except at the lateral margins), apical margin slightly excavated; first three segments longitudinally carinate; connexivum semivertical. *Macropterous form:* pronotum produced basally into a short acute porrect spine; elytral neuration distinct.

♀. Third antennal segment and anterior tibiæ not so strongly dilated as in the male, but more so than in the other species of the genus. Posterior femora incrassate (similarly to the same sex of *R. distincta*), armed beneath with one large and two or three small teeth. Sixth (? seventh) abdominal segment very long, nearly twice as long as the fifth, slightly biexcavate apically; abdomen scarcely (except slightly towards the base) carinate ventrally. Connexiva vertical in apterous form, and much narrowed in from the base at first, afterwards continuing subparallel. *Macropterous form:* pronotum produced basally in a long stout process, which is about equal in length to the space between its origin and the humeral angles of the pronotum. It arises at an angle of about 45°, curves around near its apex, and is then deflected downwards slightly. Elytral neuration feebler than in the male.

Habitat. (α) Rio Cobre, Spanish Town, St. Catharine, Nov. 7th, 1892; clear water—no surface growth—sluggish current; taken close to bank of river. (β) Black River, Elysium Estate, Portland, April 4th, 1899 (*C. B. Taylor*).

Black; the posterior and intermediate femora and tibiæ slightly greenish blue (metallic lustre), furnished somewhat sparsely (more densely on the nota) with pale gold pubescence. Base of first antennal segment, base of anterior femora and anterior margin of pronotum, ventral surface of ambulacra, coxæ, trochanters (usually), &c., pallid testaceous. Teeth of posterior femora pallid except at apex. Dorsum of abdomen shining black, connexivum rufo-testaceous; ventral surface usually bluish grey (often greatly rufescent), except the brownish genital segments.

The male of this fine little species, which I have much pleasure in naming after its discoverer, is readily distinguishable from the same sex of all the other American species of the genus by the dilated anterior tibiæ, except *R. collaris* (Burm.), in which the posterior tibiæ are notably sinuate. I think also that the form of the sixth (? seventh) abdominal segment in the male is different from that of any other species.

The type of *R. tayloriella* is the winged male individual. The species is probably that recorded by Johnson and Fox as *R. collaris* (Burm.) in 1892, Ent. News, iii. p. 60. [See also Entom. 1899, p. 30, No. 10.]

16. *Microvelia* sp.

A macropterous individual and two nymphs of a species I have not yet been able to identify.

BRITISH DRAGONFLIES OF THE OLDER ENGLISH AUTHORS.

By W. J. Lucas, B.A., F.E.S.

(Continued from p. 42.)

2. *E. Donovan: 'The Natural History of British Insects,'* 1792–1813.

In the sixteen volumes comprising this work we have presented to us a large number of generally well-executed hand-coloured plates of British Insects, with accompanying letterpress in English. It is got up somewhat in the same manner as Curtis's later and well-known work, and is a decided advance on that of Harris.

Vol. I. Pl. XXIV. P. 53.

Libellula depressa ♀ = *Libellula depressa* ♀.

Plate XXXVI. P. 79.

Libellula virgo (fig. 1) = *Calopteryx virgo* ♂. [It is called *Lib. puella;* but this is evidently a misprint for *virgo*, under which designation it appears in the index.]

Libellula puella (fig. 2) = *Pyrrhosoma nymphula.* [By the figure apparently a male.]

Vol. II. Pl. XLIV. P. 21.

Larva of **Libellula depressa** = nymph of one of the *Æschnidæ.*

Vol. III. Pl. LXXXI. P. 23.

Libellula depressa ♂ = *Libellula depressa* ♂.

Vol. V. Pl. CLXVI. P. 77.

Libellula grandis = *Æschna cyanea* (♀ apparently). [This insect cannot be *Æ. grandis*, for it is a blue-spotted species, and has hyaline wings. In some respects it bears a little resemblance to *Æ. juncea;* but, judging by the small pterostigma and other points, there is little doubt that it is intended for *Æ. cyanea.*]

Vol. X. Pl. CCCXXXVII. P. 29.

Libellula vulgata (fig. 1) = *Sympetrum striolatum* ♀. [No doubt it is intended for this species of the genus *Sympetrum*, if only because it is described as very common.]

Libellula grandis (fig. 2) = *Æschna grandis* ♂. [The insect is figured with saffron wings.]

Vol. XII. Pl. CCCCVII. P. 39.

Libellula quadrimaculata = *Libellula quadrimaculata* ♀. [The unsuffused, Scotch form.]

Pl. CCCCXV. P. 61.

Libellula ænea = *Cordulia ænea* (♀, apparently). [There are two figures, the lower one with yellow wings, Donovan calls the latter a variety; but the variation is probably due to the figure being taken from an immature specimen.]

Pl. CCCCXXIII. P. 81.

Libellula forcipata = *Gomphus vulgatissimus* (♀, apparently). [Below the figure of the imago is one of a pupa, as Donovan calls it. It is perhaps intended for a nymph of this species, but does not resemble it in shape. The eyes are like round beads at the fore corners of the head, which ends in a point in front. The distal edge of the mask is round. The wing-cases are small.]

Pl. CCCCXXV. P. 85.

Libellula quadrifasciata = *Libellula fulva* (♀, apparently). [The abdomen is not blue, and there is a fuscous band at the tip of all the wings.]

Pl. CCCCXXX. P. 97.

Libellula boltonii = *Cordulegaster annulatus* ♂.

Vol. XIII. Pl. CCCCXLIX. P. 35.

Libellula biguttata = *Orthetrum cærulescens* ♂. [The abdomen is blue.]

Vol. XIV. Pl. CCCCLXXII. P. 17.

Libellula cancellata = *Orthetrum cancellatum*. [The sex is somewhat doubtful; by shape the insect is perhaps a male, but the abdomen is yellow.]

Vol. XV. Pl. DXXIII. P. 39.

Libellula scotica = *Sympetrum scoticum* (♂, ♀). [This insect Donovan was the first to describe. He gives two figures—one of each sex.]

NOTES ON THE GREAT EARWIG AND OTHER BRITISH FORFICULIDÆ.

By C. W. Dale.

Labidura riparia, Pall. = *gigantea*, Fab.—This fine species of earwig has hitherto been found only in the vicinity of Bournemouth, where examples were secured by the Rev. W. Bingley, on the 7th of July, 1808; these were exhibited the following November by Mr. G. B. Sowerby at a meeting of the old Entomological Society. Mr. Bingley, in a letter to the Treasurer of the Linnean Society, states that as he was walking on the beach west of Christchurch, just at the close of the evening, he saw two or three large insects running along the sand, about or rather below high-water mark, and from their size and manner he took them to be young mole crickets. Surprised at seeing such insects in that situation, he examined them as well as the light would permit, and, by their immense forceps and size, found them to be a species of *Forficula* hitherto undescribed as British. He took home some specimens, and ascertained them to be the *Forficula gigantea* of Fabricius. Mr. Sloman, a friend of Mr. Bingley, sought for them afterwards in the same place, and found a great number concealed under large stones on the sands. Mr. Bingley put three or four together into his box; and the consequence was that one of them was devoured by the rest.

In their habits these insects greatly resemble the common earwig; but when approached they turn up their abdomen in the manner of the large Staphylini, bending the extremity quite over the head, which they defend by means of their enormous forceps. The largest he could procure was nearly fifteen lines in length (=about 30 mm.), exclusive of the antennæ, which measured somewhat more than half an inch.

Mr. Sloman, who lived at Wick, and old Lochyer, of Christchurch, accompanied my father and Mr. Dashwood to the same spot—Mount Misery—in 1818, but with no success.

Upon what was once a most dreary and desolate spot now stands the rising seaside resort of Southbourne-upon-Sea.

This earwig came to be reckoned amongst the extinct British species (its native origin being actually questioned by the Rev. W. Kirby in his 'Introduction to Entomology') until 1865, when a few were taken on the shore close to Hengisbury Head by Mr. Dossetor. The next was taken near the pier at Bournemouth, by Mr. E. Saunders, in 1874.

Mr. Kemp-Welch, in an article on the great earwig ('Transactions' of Dorset Field Club, vol. viii. p. 61), records and figures a specimen in his possession as having been taken on the beach under Branksome Park, some two miles westward from Bournemouth, within the limits of Dorsetshire, on the 27th of May, 1886, by Mr. E. Lovett, of Croydon. The Rev. J. G. Wood, in his 'Insects at Home,' mentions one as having been taken, also on the beach, at Folkestone, but gives no date.

Like the common earwig, the large one appears to conceal itself as much as possible in the daytime, probably in chinks and crannies of the cliffs, and only emerges at the approach of evening to seek its food, which consists probably of the various small animals, molluscous and otherwise, that are left on the shore by the tide.

It is widely distributed on the Continent, and has been taken as far north as Brittany and Berlin, but appears always to frequent the sea-shore or the banks of rivers. It also occurs in Asia, Africa, and America.

Chelidura albipennis, Meg.—The only examples of this species were taken in a nursery garden at Ashford, in Kent, in June, 1832, by Professor Westwood.

Forficula lesnei, Finot.—Under the two names of *pubescens*, Géné, and *decipiens*, Géné, this species first appeared as British in a 'List of British Euplexoptera, Orthoptera, Thysanoptera, and Hemiptera,' compiled by Mr. Walker in 1860. It was first taken by my father at Charmouth in September, 1837. He also found it near Weymouth and at Bonchurch in the Isle of Wight, and I have found it besides at Bournemouth, Sidmouth, Falmouth, and in the Scilly Isles. It hibernates in the stems of the common reed. Under the name *decipiens*, Géné (Weekly Entomologist, 1863, p. 11), my father states that Mr. Curtis took a specimen near Salisbury, at Wilton, in May, 1852, and that he "took one in the middle of November, 1860, from laurels here close to our house, and as no reeds were in either place he considered that those examples might have been referable to *decipiens*." Although *F. lesnei* has not been a rare species, still no one else appears to have met with it until Mr. Burr took a specimen at Folkestone, in the Warren, in 1896, and Mr. Donisthorpe one at Wallingford in Berkshire. (See 'British Naturalist' for December, 1897, where Mr. Burr first announced its right name.) Judging by the recent captures at Leatherhead, it appears to be as much an inland as a coast species, although apparently confined to the southern counties.

[*Chelidura* (=*Apterygida*) *albipennis* has also been taken in Norfolk. Only last year Mr. J. Edwards sent to Mr. Burr, for inspection, a pair which he took near Norwich some ten years ago. *F. lesnei* is, in Surrey, by no means confined to Leatherhead.—W. J. L.]

ON *ÆGALEUS BECHUANA*, A NEW SPECIES OF CIMICIDÆ, REPORTED TO INJURE COFFEE-BERRIES IN BRITISH CENTRAL AFRICA.

By G. W. Kirkaldy, F.E.S.

The *Strachia* group is perhaps the most injurious, economically, of the Cimicidæ. Usually conspicuously coloured, some of the species do immense damage, particularly to Cruciferous and Rubiaceous plants in both hemispheres. In America, *Murgantia histrionica* (Hahn) ravages cabbages, mustard, radish, turnips, grapes, corn, sunflowers, and Cucurbitaceæ! * while the closely-allied *M. munda* (Dallas) also infests cabbage; and in Europe similar reports have been circulated as to *Eurydema ornatum* (Linn.). In the Oriental region, two species, *viz. Antestia cruciata* (Fabr.) † and *Bagrada picta* (Fabr.), have been sent to me by my friend Mr. E. E. Green, Government Entomologist of Ceylon, as injurious to coffee-berries. The genus *Antestia* has also a similar evil reputation in Africa.

A pair of bugs (♂ ♀) have recently been sent me from British Central Africa through Mr. Green, with the report that they were puncturing coffee-berries. Closely related to *Antestia*, a detailed examination shows that they belong to the genus

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* See especially Lintner's 'First New York Report for 1882' (1883), pp. 264–71; and U.S. Dept. Agriculture's Tenth Circular (2nd series), 1895, pp. 1, 2.

† Quoted in Nietner's 'Enemies of Coffee Tree' (1861), p. 18 [revised edition, p. 13], under the name of *Strachia geometrica*, Motsch.

Ægaleus, Stål (of which four species, all from Africa, were previously known), and are apparently as yet undescribed. The details upon which *Ægaleus* has been separated from *Antestia* appear trivial enough, even in the much discerpted Cimicidæ, but as Lethierry and Severin (Cat. Hém. i. 175) follow Stål, I have also fallen into line.

Ægaleus bechuana, sp. n.

Densely punctured. Head longitudinally somewhat convex. Tylus passing a little beyond the juga. Second segment of abdomen destitute ventrally of a spine or tubercle. Thorax with the antero-lateral margins slightly rounded. Scutellum somewhat wide at the base ("apex," auctt. !).

♂. Sixth segment beneath roundly excavated, the apical margin continuing in a curve to the lateral margin; apical margin of fifth segment distinctly angular in the centre.

♀. Sixth segment deeply roundly excavated, apical margin turning off at an angle at the connexivum; apical margin of fifth almost angular in the centre.

Long. ♂ 7¾ mm., ♀ 8 mm.; lat. ♂ 4¾, ♀ 5 mm.

British Central Africa (through E. E. Green), on coffee [No. 49].

Shining black; juga, antero-lateral margins of pronotum (except posteriorly), a central anterior spot on the pronotum, two large spots near the base of the scutellum, base of exocorium, apical margin and an elongate spot near the middle of the exterior margin of the corium proper, greater part of under side of head, apices of femora broadly, basal segment [others broken] of antennæ, &c., orange yellow. An interrupted longitudinal line on tylus, basal margin of head, sublateral margin posteriorly of the antero-lateral margin of pronotum, four longitudinal abbreviated lines on pronotum, a central longitudinal thin streak on the middle of the pronotum (the anterior part cutting through the orange yellow round spot before-mentioned); the lateral margin (basally), a short line in the middle close to the anterior margin, and the whole of the base ("apex," Stål) of the scutellum; base of corium and a spot in the middle of exocorium; apical half of each connexival segment above; venter (ground colour); basal half of femora—luteostramineous. [Ground colour of elytra black, with a reddish tinge.] Apical half of membrane hyaline, wings infuscate with a greenish tinge. Femora with a black spot between the apical orange yellow and the stramineous basal part; tibiæ and tarsi infuscate. Lateral margins of abdomen beneath irregularly chequered with black (or dark green), stramineous (tinged partly with luteous), and fuscous; the second to sixth segments each have an elongate orange yellow spot sublaterally, terminated interiorly and exteriorly by brown spots.

Closely allied to *Æ. inermiventris* (Stål) and *Æ. sparmanni* (Stål), but differing by the colour, and probably by the structure; but of the latter Stål has given very meagre details.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 32.)

Sericoris littoralis, *Curt.*—Howth, plentiful at the foot of the cliffs. Mr. Barrett found a second brood in September of the true Irish type—light ground colour, with rich dark markings. Co. Cork (*McA.*); Sligo (*R.*); Tramore, Co. Waterford (*K.*); Belfast (*W.*).

S. fuligana, *Haw.*—Minehead, Co. Waterford (*K.*).

S. cespitana, *Hb.*—Howth, abundant on the top of the cliffs (*B.*), Minehead, Co. Waterford (*K.*), Sligo (*R.*), Bundoran (*J.*)

S. rivulana, *Scop.*—Howth (*B.*), Armagh (*J.*).

S. urticana, *Hb.*—Everywhere common.

S. lacunana, *Dup.*—Everywhere common.

Mixodia schulziana, *Fb.*—Howth, Mourne Mts., Co. Down (*B.*), Carlingford, Armagh (*J.*), Belfast Hills, locally abundant (*W.*). On Lugduff, Co. Wicklow (*G. V. H.*), Galway (*R. E. D.*).

M. palustrana, *Zell.* — Lugduff, Co. Wicklow (*G. V. H.*); Enniskillen (*P.*).

Euchromia purpurana, *Haw.*—Howth (*B.*), Roches Point, Co. Cork (*K.*).

Orthotænia antiquana, *Hb.*—Howth, and Wicklow Mts. (*B.*), Roches Point, Co. Cork (*K.*), Valentine's Glen, Belfast (*W.*), Armagh (*J.*), Sligo (*R.*).

O. ericetana, *Westw.*—Co. Cork (*McArthur*).

Eriopsela fractifasciana, *Haw.*—Galway (*R. E. D.*).

Cnephasia politana, *Haw.* — Galway (*B.*), Favour Royal, Tyrone (*K.*), Sligo (*R.*), Belfast (*W.*).

C. musculana, *Hb.*—Wicklow Mts., Favour Royal, Tyrone (*K.*), Armagh (*J.*), Belfast, locally common (*W.*); L. Gill, and Glengarriff (*K.*).

Sciaphila conspersana, *Dougl.*—Belfast (*W.*), Clonbrock, Co. Galway, very dark form (*R. E. D.*). Minehead, Co. Waterford (*K.*); Coolmore, Donegal (*J.*); Portrush, Favour Royal, Tyrone (*K.*); Sligo (*R.*), Howth (*H.*).

S. subjectana, *Gn.*—Common everywhere. The ? var. *passivana* is common at Howth.

S. virgaureana, *Tr.*—Dublin Coast, common. Derry (*C.*), Belfast (*W.*), Armagh (*J.*), Enniskillen (*P.*), Sligo (*R.*); Tyrone (*K.*).

S. chrysantheana, *Dup.*—Farnham, Cavan (*K.*).

S. hybridana, *Hb.*—Dublin; Killough, Co. Down.

S. colquhounana, *Sta.*—Howth, on the cliffs. Magilligan, abundant, Roches Point, Co. Cork, and other localities on the rock-bound southern coasts of Cork and Kerry; as well as on the rock islands lying three to six miles in the offing, such as the Blaskets, &c. Flies towards midnight, and is attracted by light (*K.*).

Sphaleroptera ictericana, *Haw.*—Killarney. Sligo (*R.*); Belfast (*W.*).

Capua favillaceana, *Hb.*—Killarney, Wicklow Mts.

Clepsis rusticana, *Tr.*—Killarney. Belfast, local (*W.*), Clonbrock, Co. Galway (*R. E. D.*); Enniskillen (*P.*).

Bactra lanceolana, *Hb.*—Howth, abundant. Favour Royal, Tyrone (*K.*), Armagh (*J.*), Belfast (*W.*), Derry (*C.*), Sligo (*R.*), Clonbrock, Co. Galway (*R. E. D.*), near Belleek (*J.*).

B. furfurana, *Haw.*—Killarney. Roches Point, Co. Cork, one (*K.*).

Phoxopteryx siculana, *Hb.*—Killarney.

P. unguicella, *L.*—Glendalough, Co. Wicklow (*G. V. H.*); Favour Royal, Tyrone (*K.*).

P. uncana, *Hb.*—Belfast. Sligo (*R.*), Clonbrock, Co. Galway (*R. E. D.*), Co. Cork (*McArthur*), Armagh (*W. F. J.*).

P. biarcuana, *St.*—Galway (*C. G. B.*), and Clonbrock (*R. E. D.*), Sligo (*R.*); Favour Royal, Tyrone (*K.*).

P. comptana, *Fröl.*—Sligo (*R.*).

P. myrtillana, *Tr.*—Wicklow Mts., Belfast.

P. lundana, *Fb.*—Common everywhere.

P. mitterpacheriana, *Schiff.*—Roebuck, near Dublin, Belfast, Galway.

Grapholitha ramella, *L.*—Wicklow Mts., Favour Royal, Tyrone (*K.*), Westport, Mayo (*W.*), Enniskillen (*P.*).

G. nisella, *Clerck.*—Wicklow (*G. V. H.*); Enniskillen (*P.*); Hollybrook near Boyle, and Favour Royal, Tyrone (*K.*).

G. nigromaculana, *Haw.*—Sligo (*R.*), Donegal (*J.*).

G. subocellana, *Don.*—Killarney (*Meek*), Belfast, abundant (*W.*), Sligo (*R.*).

G. trimaculana, *Don.*—Dublin, Wicklow? Belfast, abundant (*W.*).

G. penkleriana, *Fisch.*—Belfast, Armagh (*J.*), Sligo (*R.*), Powerscourt (*K.*).

G. nævana, *Hb.*—Belfast, Derry (*C.*), Sligo (*R.*), Enniskillen (*P.*).

G. geminana, *St.*—Wicklow Mts., Sligo (*R.*).

Phlæodes tetraquetrana, *Haw.*—Generally common.

P. IMMUNDANA, *Fisch.*—Wicklow Mts., Clonbrock, Co. Galway (*R. E. D.*), Sligo (*R.*), Enniskillen (*P.*).

HYPERMECIA CRUCIANA, *L.*—Enniskillen (*P.*). Dublin, Killarney, common, Sligo (*R.*); Portrush (*C.*).

BATODES ANGUSTIORANA, *Haw.*—Killarney, Belfast (*W.*), Enniskillen (*P.*).

PÆDISCA BILUNANA, *Haw.*—Killarney (*K.*), Armagh (*J.*), Clonbrock, Galway (*R. E. D.*), Sligo (*R.*), Enniskillen (*P.*), Belfast (*W.*).

P. CORTICANA, *Hb.*—Howth, Belfast (*W.*), Sligo (*R.*), Enniskillen (*P.*).

P. OPHTHALMICANA, *Hb.*—Enniskillen (*P.*).

P. SEMIFUSCANA, *St.*—Enniskillen (*P.*), Sligo (*P.*).

P. SOLANDRIANA, *L.* — Killarney, Enniskillen (*P.*), Sligo (*R.*), Favour Royal, Tyrone (*K.*).

EPHIPPIPHORA SIMILANA, *Hb.*—Belfast, Killarney, and Favour Royal, Tyrone (*K.*).

E. CIRSIANA, *Zell.*—Coast near Dublin, Sligo (*R.*), Clonbrock, Galway (*R. E. D.*), Collin Glen, near Belfast, abundant (*W.*), Armagh (*J.*).

E. PFLUGIANA, *Haw.*—Dublin, Galway, Sligo (*R.*), Killynon, Westmeath (*K.*), and Killarney, Galway (*R. E. D.*); Donegal (*J.*).

E. BRUNNICHIANA, *Fröl.*—Wicklow Mts., Howth, abundant, Belfast, abundant (*W.*), Armagh (*J.*), Sligo (*R.*), Clonbrock, Galway (*R. E. D.*), Dingle, Kerry (*C. G. B.*).

E. INOPIANA, *Haw.*—Armagh (*J.*).

E. TRIGEMINANA, *St.*—Howth, plentiful, also at Favour Royal, Tyrone; near Donegal, and at Glengariff (*K.*); Belfast (*W.*), Bundoran (*J.*), Sligo (*R.*).

E. POPULANA, *Fb.*—Enniskillen (*P.*).

OLINDIA ULMANA, *Hb.*—Galway, Newcastle, Co. Down, and Westport, scarce (*W.*).

SEMASIA IANTHINANA, *Dup.*—Cork? and Wicklow Mts.? (*C. G. B.*), Sligo (*R.*).

S. RUFILLANA, *Wilk.*—Galway, Howth, and Favour Royal, Tyrone (*K.*).

S. WŒBERIANA, *Schiff.*—Belfast.

COCCYX TÆDELLA, *Clerck.* — Clonbrock, Galway (*R. E. D.*), Sligo (*R.*).

C. USTOMACULANA, *Curt.*—Sligo (*R.*).

C. VACCINIANA, *Fisch.*—Raheny, Co. Dublin (*G. V. H.*); Derry (*W. H. C.*).

PAMPLUSIA MERCURIANA, *Hb.*—Slieve Bingian, Mourne Mts., 2500 ft., abundant (*W.*); Dublin Mts. (*G. V. H.*).

RETINIA BUOLIANA, *Schiff.*—Belfast (*W.*).

R. PINIVORANA, *Zell.*—Holywood, Co. Down; Galway; and Clonbrock (*R. E. D.*).

CARPOCAPSA POMONELLA, *L.*—Cork? Sligo (*R.*).

C. SPLENDANA, *Haw.*—Donegal (*J.*).

ENDOPISA NIGRICANA, *St.*—Wicklow Mts.?

STIGMONOTA RAVULANA, *H.-S.*—Killarney (*Salvage*).

S. PERLEPIDANA, *Haw.*—Raheny, near Dublin, Armagh (*J.*), Collin Glen, near Belfast, abundant (*W.*), Enniskillen (*P.*), Sligo (*R.*).

S. COMPOSITELLA, *Fb.*—Sligo (*R.*).

S. REGIANA, *Zell.*—Roebuck, near Dublin, and at the Rockabill lighthouse, two miles off Skerries shore (*K.*), Armagh (*J.*).

S. GERMARANA, *Hb.*—Killarney.

DICRORAMPHA ALPINANA, *Tr.*—Sligo (*R.*).

D. PETIVERELLA, *L.*—Howth, abundant. Cork? Minehead, Co. Waterford (*K.*). Sligo (*R.*).

D. PLUMBANA, *Scop.*—On the slopes of G.N.R., near Dublin, Howth; Knockagh, Co. Down (*W.*), Sligo (*R.*), Ardrahan, Galway (*K.*), abundant.

D. PLUMBAGANA, *Tr.*—Sligo (*R.*).

D. HERBOSANA, *Bar.*—Donegal (*J.*); Belfast Hills.

D. ACUMINATANA, *Zell.*—Howth, Sligo (*R.*).

PYRODES RHEEDIELLA, *Clerck.*—Dublin, Holywood, Co. Down, Armagh (*J.*).

(To be continued.)

ON THE MOULT TO PUPA IN *PTEROPHORUS.*

By T. A. CHAPMAN, M.D., F.E.S.

THE pupæ in the PTEROPHORINA are suspended by the cremaster only, and are suspended in all attitudes, as, for example, with head upwards or downwards on a vertical surface, or even back downwards under a horizontal one. Being quite ignorant on the point, I desired to see how the hold on the cremaster was obtained, and how the pupa was sustained at the critical moment of quitting the larval hold of the silken carpet. Incidentally, I desired to learn the precise arrangement of the cremaster, which in this family consists of two portions—a forward portion and a terminal one. I have usually considered the forward portion as springing from the eighth abdominal segment, and this proves to be correct; the doubt arises from the fact that in many species the tenth segment appears to stretch forwards anteriorly—does, in fact, so stretch forwards that it almost appears to reach the anterior group of hooks, and one cannot help a suspicion that it reaches further and actually carries them; in the mature pupa or in the empty case it is not easy to be satisfied that this is not the fact. At the period of the moult it was abundantly plain that the anterior hooks belonged to segment eighth abdominal.

I obtained some larvæ of *Pterophorus galactodactylus*, and was fortunate enough to observe three individuals moulting to pupa. This is a species that pupates beneath a leaf, and therefore often inverted. The moult took place in all three examples about 1 p.m., after some two days' quiescence. The larva spins a slight silken carpet, on which it rests, and which extends about one-twentieth of an inch all round the larva beyond it, and is no thicker at the critical position under the anal segments than elsewhere.

When the moult takes place the larva holds on by the anal prolegs only; the props of the ventral legs stand out stiffly, but the hooks now take no hold of the silk; how this happens I did not ascertain. In many Pierids the body hangs arched away from the silken pad, preventing the ventral prolegs from touching it; but I do not know how this is managed in the Pierids, Papilionids, and Lycænids, where the prolegs touch the pad, as they certainly do in *P. galactodactylus*. The anal prolegs hold well, so that they must be managed differently from the ventral ones. It is less difficult to understand how *all* the prolegs take no hold, as in pupæ in cocoons, &c.

The moulting is done rather rapidly—within, that is, about fifteen minutes from the first efforts noticed. The rhythmic movements, beginning at the last segments, at first push the abdominal segments, about the second to sixth, forwards within the larva skin, as evidenced by the tracheal threads very plainly seen through the transparent skin being withdrawn from the pupal spiracles. When these have passed forwards about one segment, or rather when the larval skin has passed backwards so far, all the abdominal tracheæ are withdrawn more or less, the first not quite a full segment's length. The thoracic segments are now crowded forwards, and the stretching of the larva skin raises the front part of the larva from the surface in a curve. Shortly it is seen that the anal segments of the pupa still occupy those of the larva, and the skin, as it is pushed backwards, gathers in a roll on the eighth abdominal segment. The skin splits dorsally down the head and thoracic segments, but not quite to the hind margin of the third one. The uncoiling of the antennæ from within the larval head is easily seen. The crest of hairs on the pupal wing enables it to be seen occupying its own segment in the larva, and rapidly expanding as it assumes its pupal direction and position. When once the skin splits it slips back rather rapidly, and one has to be alert to see what is happening. It continues to form a roll round the eighth abdominal segment. Just before the posterior margin of the opening reaches here, the ninth and tenth segments are seen within the larva skin to be actively directing the extremity of the pupa dorsally, and pushing the dorsal part of the roll of larva skin backwards. The pupal extremity thus curls forwards, with a definite step at each vermicular movement, and, before one quite expects it, it appears through the opening dorsally. It is not the stiff spike one knows in the mature pupa, but contorts itself as actively as the same segments in the most lively Tortrix or Tinea larva, bending not only at the incisions of segments, but in their length. It then stretches and pushes over the side of the larva skin, and reaches the silken carpet. The remainder of the pupa then leaves the larval skin, and pushes it away.

The larva of *galactodactylus* has many stiff hairs, and it seemed that the larva, when inverted, maintained its position, and did not swing free, like a *Vanessa*, by the pressure of the hairs of the last segments posterior to the prolegs against the surface of suspension. This does not explain how the problem is met in the smoother larvæ, if, indeed, these do assume so difficult a position. *Agdistis*, for instance, takes usually a vertical attitude, with head downwards.

The larval skin accumulates round the eighth abdominal segment and ventrally remains there, whilst dorsally it is pushed further back by the ninth and tenth segments, which, as I have noted above, thus escape from the dorsal slit in the larval skin, and find the silken pad to which the cremastral hooks on ten become fixed. What prevents the skin going further back ventrally, and what supports the pupa after the cremaster is withdrawn from the larval skin? The same answer solves these two questions. The cremastral hooks on the under side of eighth (abdominal) segment, which, like the anal ones, are already stiff and chitinised, stand out like a brush and form an obstacle to the further progress of the larval skin backwards. One specimen which I arrested, at the critical moment when the cremaster was freed, had these hooks in a sort of pocket of the larval skin, of which the anterior lip was the roll of larval skin, the posterior the margin of the slit in the larval skin, and in some degree the roll of dorsal skin behind this and the inside of the bases of the anal prolegs of the larva.

I have remarked that the last segments are very soft and mobile, and the under surface of eighth being sharply curved and made very convex by the dorsal movements of ninth and tenth, will spread the cremastral hooks of its armature in a radiating manner, so that taken together they form a sort of a knob in the pocket of larva skin, and hold the pupa firmly and safely. It is evident that when the end of the pupa seizes the pad of silk, and the pupa then straightens itself, the radiating hooks will fall together and easily free themselves from the pocket. There is, however, a second string to the bow. I so interfered with one pupa that it did not secure a grip with the hooks of tenth segment, and then got the hooks under eighth from their pocket. The pupa nevertheless did not fall, but was sustained by the adhesion of the thoracic larval skin to the front of the fifth and sixth abdominal segments, and was so sustained for a considerable time till the pupa reached the silk. It did not, however, do so very satisfactorily, and the hooks of eighth failed to get a proper hold. It would seem that the proper use of this adhesion is to increase the pressure of the hooks of eighth segment against the margin of the pocket, and, after the terminal hooks are engaged in the silk, to steady the pupa, whilst those of eighth segment are freed from the larva skin and fixed on the silken carpet.

In *Hypercallia* and *Anchinia* the method of pupal suspension is precisely the same as in *Pterophorus*; and in these the anal hooks are supplemented by some on the ventral aspect of the eighth abdominal segment in like manner. There can be little doubt that their use is the same as in *Pterophorus*, both to secure safety at the time of moult and stiffness in the pupal position afterwards. Are these instances of the separate origin of complex apparatus and functions, in unrelated species, or is there any possible relationship? The pupæ are certainly otherwise so very different that such relationship must be distant.

Betula, Reigate: June, 1899.

NOTE ON THE COCCID GENUS *OUDABLIS*, Signoret.

By T. D. A. Cockerell, N.M.Agr.Exp.Sta.

Signoret in 1875 proposed the name *Boisduvalia* for Coccids resembling *Dactylopius*, but having four white caudal filaments in the male, instead of only two. Later, he changed this name to *Oudablis*, because he had himself used *Boisduvalia* in 1868 for a genus of Aphididæ. Loew (Wien. Ent. Zeit., 1883) objected to this substitution, on the ground that the *Boisduvalia* of 1868 was a *nomen nudum;* but this objection cannot hold, since there were already genera named *Boisduvalia*, Desv., 1830 (Diptera), and *Boisduvalia*, Montr., 1855 (Coleoptera).

Signoret in 1875 recognised two species of *Oudablis*, both found in France—namely, *O. lauri* (Boisduval) and *O. quadricaudata* (Sign.). Both of these resembled *Dactylopius* in the female having 8-jointed antennæ. Lichtenstein in 1881 added a third species, *O. parietariæ* (Licht.), but unfortunately never published a full diagnosis of it.

In 1882 Lichtenstein (Bull. Soc. Ent. France, p. lxxv) recorded an insect found on the leaves of *Rubus discolor*, proposing for it a new generic name, *Tetrura*. The female was of a dark red purple, much like the Mexican cochineal; and the male, appearing in March, was red, with four white caudal filaments, as in *Oudablis*. Lichtenstein called the insect *Tetrura rubi*, erroneously supposing it to be the *Coccus rubi* of Schrank. Since the latter is in reality a *Lecanium*, it is herewith proposed to employ the name *rubi* for the *Tetrura*, since no confusion will be caused thereby.

So far as Lichtenstein's account goes, *Tetrura* is not separable from *Oudablis*, but he says it is easily separated from that genus by the form of the female, as he intended to explain in detail in a subsequent work, which unhappily never appeared. European coccidologists should have no trouble in recognising the insect when found, and it is to be hoped that before long we may hear of its rediscovery.

The next contribution to the subject of *Oudablis* was an important one by Loew in the 'Wiener Entomologische Zeitung' for 1883. Loew described a new species (*O. piceæ*) found on *Abies excelsa* in the country about Vienna. This insect had in the male the four caudal filaments of *Oudablis*, the posterior ones the longer; but the female had 9-jointed antennæ, like a *Phenacoccus*.

So far, all the species found were European. In 1899 M. d'Emmerez de Charmoy published (Proc. Soc. Amicale Scientique, p. 42, pl. iii. figs. 3, 3*a*) an insect found in the island of Mauritius on *Solanum*, calling it *Phenacoccus nivalis*, Maskell. The description of the female given by De Charmoy is practically a translation from that of Maskell; but the figures of both sexes, and the description of the male, pertain to the Mauritius insect, which is evidently distinct from that found by Koebele in Australia, and described by Maskell.

Maskell says the male of his *P. nivalis* has the two usual cottony tails, and two shorter median setæ. The latter, I imagine, were mere naked bristles. The Mauritius insect (male) is figured with four long tails, which are stated in the description to be cottony—that is, the male is that of an *Oudablis*. The female, however, has 9-jointed antennæ, as in Loew's *O. piceæ*.

On October 8th, 1899, at 8.15 a.m., I found some females of *Phenacoccus helianthi* (Ckll.) on *Helianthus annuus* at Phœnix, Arizona. Flying round the plants were what seemed to be a number of little midges, but on capturing some I found they were the hitherto unknown males of *P. helianthi*. These males were pale grey; mesosternum shining yellowish; eyes purplish; wings mealy white, iridescent. But I was surprised to see that they had four white caudal filaments, the outer ones shorter than the inner, but still long.

Thus it appears that both *Dactylopius* and *Phenacoccus* are to be divided into two groups, a normal one with two cottony filaments in the male, and one in which the male has four filaments. If it is worth while to recognise *Oudablis* as distinct from *Dactylopius,* the parallel forms in *Phenacoccus* should similarly be separated, and it is here proposed to call them *Paroudablis.* Typical *Phenacoccus* will include such species as *P. aceris*, and even, so far as the filaments of the male go, the otherwise peculiar *P. yuccæ. Paroudablis* will include Loew's *piceæ;* De Charmoy's Mauritius insect, which is at present nameless; and my *helianthi.* For the present, however, I would treat it only as a subgenus of *Phenacoccus;* and *Oudablis* may be considered a subgenus of *Dactylopius.*

A word should be added regarding *Phenacoccus socius* (Newstead), found at Wakefield, Yorkshire. The male is said to have "two long and two short white filaments, the latter not reaching beyond the closed wings." This points to a *Paroudablis.* The species is stated to be near *P. mespili,* but to differ in being greenish-yellow. This is almost exactly what might be said of *P. pruni* (Burmeister), but in view of Burmeister's inadequate description, the identity of *pruni* with *socius* could only be surmised, hardly proved.

Mesilla Park, New Mexico: Dec. 14th, 1899.

NOTES AND OBSERVATIONS.

A Second Generation of Vanessa io, Linn.—M. Ude records (Entom. Nachrichten, 1899, xxv. 366) that on Sept. 20th last he found at Rehberge, near Berlin, a number of half-grown larvæ of *V. io* (found as a rule only in May or June, sometimes in July), which produced normal butterflies in due course. The author remarks that in the course of twelve years' collecting he has never before found a second generation of this species.—G. W. K.

Earwigs Beneficial. — *Forficula auricularia,* Linn., is reported ('Rovartani Lapok,' 1899, p. 175, and appendix, p. 16) to be beneficial by exterminating larvæ of *Conchilis ambiguella.* This supports Rühl's opinion as to the normal diet of the earwig being carnivorous (1887, M.T. Schweiz. Ges. vii. 310).—G. W. K.

The Flavour of Caterpillars.—"De La Lande—the celebrated astronomer," says d'Isjonvalle, "often supped with me on Saturdays, and found nothing more to his liking than to eat caterpillars and spiders when in season. As my room opened directly on to a fine garden, he easily found the wherewithal to satisfy his first hunger; but as Madame d'Isjonvalle likes to do things well, she used to collect some during the afternoon, to offer him on his arrival. As I always declined my share of this relish, I can only trust to hearsay for the difference in flavour between a spider and a caterpillar. The first, says our astronomer, has a nutty taste, the second a taste exactly like that of stone-fruit." (A. Daguin, in 'Le Naturaliste,' 1899, p. 25).—G. W. K.

Oporabia autumnata.—All the specimens of *O. autumnata* that I have taken at Rannoch were obtained in woods, chiefly birch, and the species appeared to be confined to such places. I did not observe it on the moors, even on portions adjoining the woods. If disturbed in the woods and carried by the wind on to the moorland, they quickly make their way back to the shelter of the trees. In this habit they seem to differ from *filigrammaria*.—William M. Christy.

Notes on the Nymph of Æschna cyanea.—From a pond about thirty yards long by four yards wide were taken, last year, seventy-four nymphs of *Æschna cyanea*, of which sixty-one managed successfully their final change, and were set free. Of this number thirty-one were females and thirty males. Quite forty or fifty more nymphs emerged from this same pond, as the empty skins clinging to the rushes fringing the pond remained to testify. The year before last one hundred and fourteen nymphs were taken from the same small pond, all of the same species. Of the sixty-one nymphs observed last year, a very large proportion changed by night, *viz.* fifty-four, as against seven that changed during the day. Of those observed in 1898, the complete record has unfortunately been lost; but of thirty-five emergences, twenty-five were by night and ten by day. The earliest emergence last year was that of three females on June 25th; in 1898 the earliest emergence was July 9th. Of the sixty-one insects set free last year from the first emergence on June 25th to the last on July 28th, every one went right away, and not one was seen near the pond or garden for more than a month. In the autumn, however, the usual number, about five or six perhaps, appeared, but at no time did more than one pair frequent the pond at the same time. On August 6th a nymph of *Æschna cyanea* was found, about three-fourths of an inch long, together with its cast skin, but whether this nymph came from an egg laid by one of the earlier emergences in June could not be determined. This particular pond at South Leigh, Oxfordshire, appears to be entirely monopolised by *Æschna cyanea* and *Agrion puella*. The latter, owing probably to their invisibility on the weed and their habit of lying very still, do not seem to be molested by *Æ. cyanea*. I shall be glad to exchange *Æ. cyanea* for any other nymphs at any time from now to July. The length of the nymphs now (Jan. 25th) varies from half an inch to an inch and a quarter.—Arthur East; South Leigh Vicarage, Witney, Oxon.

Æschna grandis on the Wing at Dusk.—On the evenings of July 12th, 13th, and 15th, from about half-past eight until almost dark, I was much interested tn watching a specimen of *Æschna grandis* busily hawking round several apple trees in my garden and in a neighbour's adjoining. It was evidently in quest of *Carpocapsa pomonella*, Linn., which was unusually abundant at the time, as I saw it catch them several times. At Reading, several years ago, whilst netting Lepidoptera at dusk, I unexpectedly caught a male of the same species of dragonfly, which in the uncertain light I had mistaken for a large moth.—A. H. Hamm; 52, St. Mary's Road, Oxford.

[*Æschna grandis* has often been noticed hunting long after the usual time for dragonflies to retire. It appears also that *Æ. juncea* and *Anax imperator* have an inclination in the same direction. It would be interesting to hear if a similar habit has been noticed in any subfamily other than the Æschninæ.—W. J. L.]

Setting Relaxed Insects.—In the last volume of the 'Entomologist' (xxxii. 307) Mr. A. H. Rydon asked a question as to the use of cement in setting relaxed insects to avoid springing. The method I have always adopted—and I have set many hundreds of relaxed insects—is to let well alone. If they are well relaxed, and allowed to dry thoroughly on the boards, I do not think Mr. Rydon will find any trouble from springing.—J. C. Warburg.

British Orthoptera.—I am engaged in collecting material for a detailed account of the Orthoptera of Great Britain and the Channel Islands, and would very gratefully receive notes as to localities, habits, dates of appearance, &c., from different parts. List of captures from Ireland would be especially welcome.—Malcolm Burr; Dormans Park, East Grinstead; February, 1900.

Collecting and Rearing Dragonflies, &c.—In a short paper, published during 1899 by the Smithsonian Institution, Washington, U.S.A., Dr. J. G. Needham gives some interesting directions for collecting and rearing dragonflies, stoneflies, and mayflies from the nymph. For this purpose he divides the nymphs into three groups—(a) those that live on the bottom; (b) those living above the bottom in still or slowly flowing water; and (c) those living in the rapids of streams—and naturally considers that special methods of collecting are required for each group.

For those living on the bottom a garden-rake is suggested to bring to the bank the loose material containing them, especially in small bays and eddies or similar spots; but for mud-loving species a sieve fastened to the end of a long handle is better. Members of the second group may be taken in ordinary dredging nets; but for those inhabiting rapid streams a large net is to be used, and in conjunction with it an instrument consisting of a long handle, terminated at one end by a brush having on its back two hooks. This instrument is used to overturn stones and then brush off the insects, which are carried by the stream into the net held just below. The captures are to be taken home in wet water-weed in a pail. Should imagines be found emerging or on the point of doing so, they and the nymphs are to be placed in distended paper bags, to contain which, as each nymph will require a separate bag, a basket is to be taken to the collecting-ground. No doubt these suggestions are admirable; but unless the ditch or pond is situated near one's back garden the transportation of the impedimenta would be a serious undertaking.

Dr. Needham suggests breeding nymphs under their natural conditions by pressing down into the mud, in shallow water, a cylinder, about fifteen inches high, made of close-meshed galvanised wire. The cylinder must be closed at the top with a lid of the same material, and of course the cage must be hidden "away from the eyes of the untutored and irreverent." But something of this kind, to be used in a somewhat different manner, has been suggested before by Mr. Marshman Wattson, who, in England, has paid a good deal of attention to breeding some of the dragonfly nymphs. He has contrived a smaller cylinder of perforated zinc, with a layer of plaster of Paris at the bottom, and covered at the top, if necessary, with a sheet of glass. It is intended to be used in aquaria, and particularly for eggs or very young nymphs. These are to be placed in the cylinder, while the food supply is outside in the body of the aquarium, and, the perforations being small, animals likely to prey on the little nymphs are not able to get in.

Not every one will agree with Dr. Needham when he says that to get good specimens of the largest dragonflies it is easiest to breed them. They will not feed in captivity, and therefore die before their colours are matured.

Besides the points called attention to above, this interesting paper contains many other hints on collecting, breeding, and preserving Neuroptera with aquatic nymphs.—W. J. Lucas; Kingston-on-Thames, February 10th, 1900.

The use of "Formalin" as a Preservative of Insects.—Now that this liquid is coming so much to the front as a universal antiseptic, it behoves entomologists to ascertain how far they can apply it to their own ends with advantage. There appears to be some doubt as to its suitability for preserving museum specimens in place of spirit (see 'Nature,' 61, 204), and, on account of the rigidity imparted to the insects, formalin would be an obviously unsuitable medium in which to collect Coleoptera, or for killing purposes either. On referring to past volumes of the 'Entomologist,' I find that formalin has been used with success to retain the natural form and colour of larvæ and pupæ after death (xxxii. 132, 188), but no account is given of employment as a preservative for the collection, although suggested by Mr. Blandford (xxx. 21). Having myself had some acquaintance with the remarkable germicidal property of formalin, which is stated by some of the best authorities to be second only to sublimate, I have used it to destroy *mould* among my insects, with results which are to me quite satisfactory. Every entomologist living in a damp locality will know how easily boxes of insects become infested with this plague, and when once established how difficult to eradicate. Painting with sublimate solution is sure but troublesome, and does not add to the beauty of the specimens; carbolic acid also must be applied *directly* to the insect. As far as my experience goes, formaldehyde (of which formalin is a forty per cent. solution in water) is the only substance completely efficacious as a vapour. The method I employ is to render the infested box or drawer as nearly as possible *air-tight*, and to enclose in it a piece of cotton-wool on which are poured from six to twelve drops of formalin according to size. This is then set on one side for a week, when the spores should all be killed. If any mouldy insect is then examined, it will be seen that the mycelium has shrivelled up, and, in the case of Coleoptera, may be removed with a brush. As it is generally more satisfactory to destroy at once Lepidoptera which are attacked to any extent, it is rather as a preventive than a cure that I would suggest its use to collectors of this order. By treating all drawers and boxes two or three times a year in the way recommended, and submitting all fresh specimens to a dose, one may, I think, be reasonably sure of not seeing mould or mites either, though ordinary care is sufficient to prevent the appearance of the latter. A natural question at once presents itself, *viz.* what is the effect on the colours of specimens? I have made several experiments to ascertain this, and can return a satisfactory answer in all cases except greens. Several species of Coleoptera have been *painted* with the solution, and no alteration could be detected in any except *Cicindela compestris*; this was slightly darkened in colour, but the vapour in a dilute form does not even effect this. The following species of Lepidoptera, among others, were subjected to a strong dose of the vapour:—*Gonopteryx rhamni*, *Anthocharis cardamines*, *Lycæna icarus*, *Melitæa athalia*, *Arctia caia*, *Orgyia antiqua*, *O. gonostigma*, *Hepialus velleda*, *Euchelia jacobææ*, *Hemithea strigata*. There was not the slightest alteration visible in any except the last named, which was distinctly darkened. The precaution must therefore be taken of removing green Lepidoptera before applying the reagent. Formalin has the advantages of being cheap and readily procurable; it is not a strong poison, and although the vapour has an irritating effect on the eyes and mucous membrane, it is quite harmless and hardly noticeable in the quantity which it is necessary to use; an occasional sneeze when examining one's collection will alone remind us of its presence. It has no appreciable action on pins, in the form of vapour.—W. S. Gilles; Bocking, Braintree, Essex.

CAPTURES AND FIELD REPORTS.

Colias hyale in 1899.—A friend of mine has just given me a fine male specimen of *C. hyale*, which he took near Ashford on August 31st last. I think it must have been a stray specimen.—S. A. Blenkarn; Clifton House, East Dulwich Road, Jan. 18th, 1900.

Sphinx convolvuli in 1899.—During last season I captured twenty specimens of *S. convolvuli* here. These were taken between August 25th and September 20th. The weather here was unfavourable for this insect, which probably accounts for none being seen after the latter date.—John P. Hyde; The Grove, Portland, Jan. 20th, 1900.

Early Occurrence of Anisopteryx æscularia. — This evening, January 23rd, a Geometer flew to light at my dining-room window at half-past nine. I went outside, just for the pleasure, as I thought, of once more seeing *Hybernia rupicapraria*, when, to my surprise, I discovered the moth to be *A. æscularia*. During the many years I have kept a look-out, I have been able to record no earlier date than February 6th, just a fortnight later than in the present instance. It has been exceptionally mild all day (the thermometer standing at 50°), a fact which no doubt accounts for this premature emergence.—(Rev.) Gilbert H. Raynor; Hazeleigh Rectory, Maldon, Essex, Jan. 23rd, 1900.

Æschna cyanea. — This dragonfly was apparently very abundant during the last summer (1899). Though I observed many specimens flying about, I only secured two: one taken on glass in the greenhouse; and the second flying in through the verandah doors and over the dinner-table was there promptly bottled. These seem unusual visits for such insects. There is little water at this somewhat high elevation (clay), save a few small ponds; and I have previously reported the species from the valley at Purley, which is a similarly waterless spot (chalk).—W. L. DISTANT; Upper Warlingham, Surrey.

MAMESTRA FURVA.—The specimens of *M. furva* recorded by me in my notes on the "Macro-Lepidoptera of the Galashiels District in 1899" (*ante*, p. 44) were taken at the end of July, not in May, as there stated.—JAMES C. HAGGART.

DWARF VANESSA ATALANTA.—In September, last year, I captured a couple of *V. atalanta*, both of which are very much smaller than the usual size. One measures one inch and a half (37 millim.) in expanse, and the other is only a little larger. Both were captured in a garden at Tendring, near Colchester.—ALAN W. CARDINALL; 18, Cromwell Road, Brighton.

[Such small examples of *V. atalanta* are not perhaps often met with on the wing, but dwarf specimens are not infrequently produced from larvæ reared in confinement.—ED.]

THAMNOTRIZON CINERUS IN THE NEW FOREST.—I took a specimen of this grasshopper in the New Forest, Sept. 20th, 1898.—C. W. COLTHRUP; 127, Barry Road, East Dulwich, S.E., Jan. 12th, 1900.

NOTE ON PHLOGOPHORA METICULOSA.—I obtained two female *P. meticulosa* at Portsmouth, at rest on a wall near electric-light lamps, on Dec. 6th last. They both laid eggs on the following day, from all of which caterpillars emerged on Jan. 1st, 1900, and which are still feeding up on cabbage and wallflower leaves. Both the moths were in good condition.—C. W. COLTHRUP; 127, Barry Road, East Dulwich, S.E., Jan. 12th, 1900.

CAPTURES AT ELECTRIC LIGHT IN CHESTER DISTRICT.—During last year I took the following species, among others, at the electric lights here:—September 3rd, one example of *Cirrhœdia xerampelina*, and one of *Epunda lutulenta;* the latter had settled on the ground and been trodden on by someone passing by, but, strange to say, was practically none the worse. *Ennomos fuscantaria* and *E. alniaria* (*tiliaria*) were both extremely common. I also secured one specimen of *E. erosaria*. *Xylophasia monoglypha* (*polyodon*) occurred in hundreds; two of the examples I captured were of the dark form, without any light markings whatever on the fore wings.—T. H. COURT; 7, Cambrian View, Chester.

LEPIDOPTERA AT LIGHT IN 1899.—During the greater part of last season I used a light trap in our garden for the first time; and on the whole the result has proved very satisfactory. Excluding Micros, I captured sixty-one species. The first captures were made on April 28th, when I obtained single specimens of *Tæniocampa gothica* and *T. stabilis*. In May I took, in addition to several more specimens of the above species, *Spilosoma menthastri* and *Anticlea nigrofasciaria* (*derivata*). Captures became somewhat more frequent in June: *Spilosoma menthastri* turned up in some numbers; and *Hepialus lupulinus*, *Cilix spinula*, *Agrotis exclamationis*, *Noctua festiva*, *Rumia cratægata*, *Odonoptera bidentata*, *Hemerophila abruptaria*, and *Melanippe fluctuata* also occurred. July proved a very productive month, and on favourable nights moths came to the trap in large numbers. On the 30th of the month I captured a specimen of *Orthosia suspecta* in the trap; and on August 2nd another specimen came to light at my window. These have been kindly identified by Mr. C. G. Barrett, to whom they were shown by Mr. Arthur Cottam. Is not this a new species for Hertfordshire? On July 21st I obtained a specimen of *Calymnia pyralina;* and on the 18th a fine *Plusia moneta* (previously recorded, Entom. xxxii. 212). Other trap captures during the month included:—*Lithosia lurideola* (plentiful), *Arctia caia, Bombyx neustria, Drepana lacertula, Phalera bucephala* (common), *Bryophila perla, Acronycta pisi, Leucania lithargyria, L. comma, L. pallens, Dipterygia scabriuscula* (*pinastri*), *Cerigo matura, Caradrina morpheus, C. alsines, Rusina tenebrosa, Noctua augur, Hadena oleracea, Selenia juliaria, Halia wavaria, Lomaspilis marginata, Melanthia ocellata, Cidaria associata, Pelurga comitata,* and *Aventia flexula.* A few additional species were taken in the trap in August: *Luperina testacea* suddenly appeared about the 8th, and was common for a few nights; and *Lophopteryx camelina, Triphæna ianthina,* and *Epione apiciaria* were also noticed. From the middle of August to the end of September I was away from home, and, consequently, was unable to do anything with the trap during that period. In October *Anchocelis pistacina, A. lunosa,* and *Miselia oxyacanthæ* were captured; and in November *Asteroscopus sphinx* (one male) and *Cheimatobia brumata.* Several additional species came to light at my window during the season, of which may be mentioned:—*Hybernia marginaria* (common in March), *Xylocampa lithoriza, Hadena dentina, Calymnia trapezina, Ennomos tiliaria, Coremia unidentaria,* and *Hydrœcia nictitans.*—Philip J. Barrard; Bushey Heath, Herts, Feb. 2nd, 1900.

Lepidoptera in 1899.—During the exceedingly mild and open winter and early spring which we experienced last year, the common Geometræ which put in an appearance at that season were very abundant in the neighbourhood of Reading. The sallows in that district were mostly in full bloom during the latter part of March, but nightly attention failed to produce anything worth having. The most curious thing about the early Noctuæ was the extraordinary abundance of *Tæniocampa stabilis,* which outnumbered all the other common moths by at least six to one. About this time a few nice specimens of *Selenia illunaria* were attracted by the lamp in a room.

Early in April a fine specimen of *Vanessa polychloros* was found hybernating in a greenhouse. This butterfly, which appears to be getting scarce, was in remarkably fine condition for the time of year.

The results of collecting during May and the earlier part of June were decidedly disappointing, and, indeed, the only decent insects taken during this period were three *Chærocampa elpenor,* which were captured while hovering over honeysuckle in the garden. About June 13th, when the weather was beautifully fine, *Macroglossa stellatarum* was abundant, but seemed to disappear again until the end of July. Sugaring produced scarcely anything until the middle of July, when *Cosmia diffinis, C. affinis, Mania maura,* and *Cerigo cytherea* were plentiful. I also took several *Gonoptera libatrix* at sugar about July 20th, which seems to be rather an early date for this species. On July 23rd a full-fed larva of *Smerinthus ocellatus* was brought to me, and on being placed in the breeding-cage immediately disappeared beneath the soil. Rather earlier than this date Pamber Wood was visited with small success, although several *Vanessa polychloros* and one beautiful *Limenitis sibylla* were seen. *Argynnis paphia* was also very plentiful.

Aug. 8th found me at Bude, in Cornwall. The best locality for insects there is the small strip of sand-dunes near the mouth of the haven. As no posts or trees were available, sugar was applied to the flowers of thistles with good effect. By this method swarms of common Agrotidæ were attracted, especially *A. tritici*, and Geometræ, particularly *Melanippe galiata*, were common. Among other insects taken in this way were *A. suffusa*, *A. exclamationis*, *A. lunigera* (two), *A. segetum* (numerous), and *A. præcox* (two beauties). *Noctua c-nigrum*, *N. baia*, *N. umbrosa*, and numerous Apameas which hung about very late. The most abundant insect during the day was *Macroglossa stellatarum*, which swarmed everywhere. Many came into the house and were captured on the window-frames, and many more were released. I remember counting fifteen of them, hovering over a strip of valerian on the roadside leading down into Boscastle. Only one specimen of *Colias edusa* was seen, but other butterflies were very plentiful; indeed, I never remember having seen so many in one day as I did on Aug. 12th, on the road between Bude and Morwenstow. *Gonopteryx rhamni* was abundant, and *Argynnis paphia* was still in good condition. The common Vanessæ, and especially *V. atalanta*, swarmed. I also noticed several specimens of *Zygæna filipendulæ* flying on the Bude sandhills during the early part of August. The weather throughout this month was remarkably fine and hot.

Having returned to Reading in September, I resumed collecting in that district, The autumn butterflies were plentiful, as was also *Macroglossa stellatarum*. No sugaring was done in the autumn, but attention was paid to the ivy-bloom. Insects were extremely scarce, owing to cold foggy nights. The only moth which was at all common was the ever-present *Phlogophora meticulosa*, while *Cerastis vaccinii* came next. *Vanessa atalanta* was on the wing as late as Nov. 5th, and about this date swarms of *Cheimatobia brumata* and *Hybernia defoliaria* made their appearance in the orchard at night. These moths appear to defy cold, and may be seen flying freely any frosty night. No more insects were captured during the year. It will thus be seen that on the whole the season did not produce much here, though I have heard of others who had better luck.—E. T. B. Reece.

Larvæ-beating in 1899 compared with 1898.—It may be interesting to lepidopterists living in the London district, and who use the beating-tray, to compare the following rough notes on the past two years with their own experiences. Speaking generally, 1899 must be considered, if not better, at least an equal of its predecessor. The localities visited were, with the exception of a few days spent in the New Forest, within the twelve mile radius. *Halias quercana* was scarcer in the generally worked localities, but in a favourite haunt, which I believe is little known and less worked, it was quite as abundant as in 1898, being as usual attended with many common larvæ. *Thecla betulæ*, which in the former year had been exceedingly scarce (only four larvæ being taken), was decidedly plentiful, during four or five excursions upwards of four dozen falling to the tray; the first day, June 10th (when the larvæ were very small), being the most successful. *T. quercus* was more plentiful in the New Forest during the past year, but larvæ of this species very few and far between in the London district. *Liparis monacha*, *Bombyx neustria*, *Trichiura cratægi*, *Amphidasys betularia*, *Odontopera bidentata*, and *Cleora lichenaria* were scarcer than in 1898; the latter of course really requires searching for. *Diloba cæruleocephala*, *Notodonta camelina*, *Miselia oxyacanthæ*, *Himera pennaria*, *Uropteryx sambucata*, *Crocallis elinguaria*, *Selenia lunaria*, *S. illunaria*, were all to be had in moderate numbers, the first five being decidedly commoner. *Notodonta dromedarius*, *Platypteryx lacertula*, *P. falcula*, *P. unguicula*, and *Demas coryli* were in sufficient quantities to be worth working for, but were rarer. *Halias prasinana* and *Catocala sponsa* were conspicuous by their absence, although in 1898 the former was quite the commonest thing on birch. Among other good larvæ taken were single specimens of *Notodonta trepida* and *Boarmia roboraria*. With regard to *Thecla betulæ*, I may add that this species seems to become decidedly common every fourth year, although I have certainly met with not less than three or four larvæ every season.—E. W. Lane; 9, Teesdale Street, Hackney Road, N.E.

Notes from Nottingham.—During the month of August, 1897, I spent two or three weeks at West Bridgford, Nottingham, and while there noted the following:—The larvæ of *Phalera bucephala* were exceedingly plentiful, and one morning, before breakfast, my cousin and I took over fifty in about five minutes, off a small poplar. I noticed this larva feeding on willow, poplar, lime, and many other trees, including sweet chestnut and rose. I found a few larvæ of *Acronycta psi* feeding on lime. On willows (pollard) growing by the river the larvæ of *Smerinthus ocellatus* and *S. populi* were found, the former being much commoner than the latter. Here I also picked up a full-fed larva of *Cossus ligniperda*, and saw, but did not trouble to take, hundreds of *P. bucephala* larvæ and an occasional *Dicranura vinula* larva. The space in which I found the *ocellatus* and *populi* larvæ was about fifty or sixty yards long, and beyond this not one was to be seen. There, however, *Aromia moschata* was very plentiful. I obtained more than twenty in the space of one hour. This separation of the beetles and larvæ struck me as very curious. Common as this beetle was in 1897, my cousin did not see any at all during the following summer. A specimen of *Dytiscus marginalis* was noted in a rain puddle barely three feet wide and six inches deep.—Oscar Whittaker; Morelands, Heaton, Bolton-le-Moors.

SOCIETIES.

Entomological Society of London.—*Sixty-seventh Annual Meeting, January 17th*, 1900.—Mr. G. H. Verrall, President, in the chair.—It was announced that the following had been elected as officers and members of Council for 1900–1901: President, Mr. G. H. Verrall; Treasurer, Mr. R. McLachlan, F.R.S.; Secretary, Mr. C. J. Gahan, M.A.; Librarian, Mr. G. C. Champion, F.Z.S.; and as other members of the Council: Mr. Charles G. Barrett; Dr. T. A. Chapman, M.D., F.Z.S.; Messrs. W. L. Distant; H. St. J. K. Donisthorpe, F.Z.S.; F. D. Godman, D.C.L., F.R.S.; A. H. Jones, and R. W. Lloyd; the Hon. Walter Rothschild, D.Sc., M.P., and Messrs. E. Saunders, F.L.S., and C. O. Waterhouse. The election to fill the vacancy on the Council and in the office of secretary, caused by the resignation of Mr. J. J. Walker, R.N., was adjourned to March 7th, the Council having signified their intention to announce at the meeting on Feb. 7th the name of the candidate whom they recommend to be elected. The President delivered an address, in which he reviewed the advantages and disadvantages under which entomologists and other men of science now labour, as compared with the conditions existing at the beginning of the nineteenth century. He called attention to certain abuses prevalent, instancing, among others, the hasty and ill-digested nature of much of the work now published, the result, as he believed, of the facilities that are given for publication. Having referred also to the vast increase in the number and variety of the publications which a student must consult in order to be fully acquainted with the work done in his special branch of study, Mr. Verrall proceeded to suggest that there should be an international agreement for the purpose, not only of restricting the number of the publications to be recognized, but of exercising some control over their contents, in order that worthless papers might be excluded. In conclusion, he briefly summarised the reforms which he considered most essential to be effected at the beginning of the new century. A vote of thanks, proposed by Prof. Meldola, and seconded by Mr. Blandford, was unanimously accorded to the President for his address, and to the President and the other officers for their services to the Society during the past year. Messrs. Verrall, McLachlan, Gahan, and Champion spoke in reply, and the proceedings terminated.

February 7th.—Mr. G. H. Verrall, President, in the chair.—The President announced that he had appointed Dr. T. A. Chapman, F.Z.S., Mr. W. L. Distant, and Mr. C. O. Waterhouse as Vice-Presidents. He announced the death of William Blundell Spence, who had been a member of the Society since its foundation in 1833, and who was for some years past the only surviving original member. Mrs. M. de la B. Nicholl, of Merthyr Mawr, Bridgend, was elected a Fellow of the Society. Mr. O. E. Janson exhibited examples of *Achias longividens*, Walk., a remarkable fly from New Guinea, in which the eyes are set at the end of very long stalk-like processes. The specimens showed great variation in the length of the eye-stalks, which in the most fully developed males considerably exceeded the length of the wings. Mr. J. W. Tutt exhibited a series of specimens of *Epunda lutulenta*, including those remarkable variations to which he had referred in his notes on the species, read at a previous meeting. Mr. Champion exhibited a large number of Coleoptera collected by Dr. Chapman, Mr. Edwards, and himself, in July last, in Switzerland. He called attention to the great variation in colour of one or two common species of the Chrysomelid genus *Orina*, and said he believed that the forms known as *O. cacaliæ*, Schrank, *O. speciosissima*, Scop., and under other names, all belonged to one extremely variable species. Prof. T. Hudson Beare showed specimens of *Dinoderus minutus*, Fab., obtained from a bamboo basket in his house at Richmond. They were specifically identical with the *Dinoderus substriatus* of Stephens. Mr. H. Donisthorpe exhibited a larva-case of *Clythra quadripunctata* taken from a nest of the red wood-ant, *Formica rufa*. He commented upon the unsatisfactory state of our knowledge as to the food-habits of the larvæ of *Clythra*, and said he believed the larvæ fed upon the eggs of the ant. The President remarked that there was a species of *Microdon* of which the pupa-case had an obvious similarity to the larva-case of *Clythra*, and was, he believed, found in the nest of the same species of ant. Mr. Gahan mentioned, in connection with the genus *Clythra*, that these beetles possess a stridulating organ on the mesonotum, not along the middle, as in Longicorns and Megalopidæ, but towards the lateral edges, and consisting of two widely separated striated areas over which the edge of the pronotum moves. The stridulating areas were present, he said, in nearly all the genera of Clythridæ, and might almost be regarded as a characteristic of the family. The fact that these beetles stridulate was apparently known to Darwin, who, in the 'Descent of Man,' erroneously stated that the stridulating area was situated on the pygidium.—C. J. GAHAN, *Hon. Sec.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY. — *December* 14*th*, 1899.—Dr. Chapman, F.E.S., in the chair. Mr. Robson exhibited a bred species of unusually large specimens of *Dianthœcia irregularis*, from Tuddenham. Major Ficklin, a specimen of *D. luteago* var. *ficklini*, which he presented to the Society's collection. Mr. Lucas, a specimen of *Somatochlora metallica*, a rare dragonfly, taken by Mr. C. A. Briggs, and presented by him to the Society's collection. Mr. Adkin, examples of *Crambus geniculeus*, taken in his garden, of a much less robust appearance than usual, and with very faintly indicated markings. Mr. Edwards, long series of the following species of *Erebia*, taken by himself in the neighbourhood of Fusio, the Simplon, and the Macunagno:—*E. ceto*, *E. lappona*, *E. goante*, *E. tyndarus*, *E. euryale*, *E. flavofasciata*, *E. melampus*, *E. epiphron*, *E. mnestra*, and a few specimens of *E. ligea*, *E. pronoe*, *E. medusa*, and *E. gorge*. Mr. F. M. B. Carr, a series of insects taken at sugar, including two *Cossus ligniperda*, and about a dozen *Macrogaster arundinis* from Wicken.

January 11*th*, 1900.—Mr. A. Harrison, F.L.S., President, in the chair.—Mr. Buckstone exhibited larvæ of *Triphæna fimbria*, some of which were of a light form and others of a dark form; and read notes on their growth, mortality, and pupation. Mr. Turner, (1) a specimen of *Periplaneta americana* from the Zoological Gardens, (2) a var. of *Melanippe fluctuata* with the central band only represented by a narrow costal fascia, (3) a specimen of *Abraxas grossulariata* with a large black spot surrounded by a white ring, outside of which the black was nearly continuous. Mr. Lucas, several lantern-slides of well-known scenery in the neighbourhood of Esher. Mr. F. Clarke exhibited a large number of very admirable photomicrographic slides of insect anatomy, including a long series of *Orgyia antiqua;* antennæ of various orders; a few of tongues, feet, &c.; a curious water hymenopteron; numerous ova of various species of Lepidpotera; a few Desmids; and living examples of *Argulus foliaceus*, the parasite of the stickleback.—HY. J. TURNER, *Hon. Report Sec.*

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—*December* 18*th*, 1899.—Mr. G. T. Bethune-Baker, President, in the chair. Mr. Chas. Pumphrey, 5, Park Road, Moseley, was elected a member of the Society. Mr. Colbran J. Wainwright showed *Physocephala rufipes* from Cornwall, and other Conopidæ and Syrphidæ. Mr. P. W. Abbott, a series of *Nola cucullatella* from London, including two very dark ones. Mr. G. T. Bethune-Baker, a number of Palæarctic insects of the genus *Satyrus*—*S. semele* and var. *bischoffi* from Asia Minor; *S. staudingeri* from Samarcand, *S. anthelea* from Asia Minor, and *S. josephi* from the Pamirs, &c.

January 15*th*, 1900.—The President in the chair.—Mr. R. C. Bradley showed *Halictus lævigatus* from Sutton, and said that it was not a common species locally. Mr. A. H. Martineau, a boxful of Aculeata Hymenoptera, chiefly Pompilidæ, including, among other rarities, *Agenia variegata* from Selsley, Glos., and Nevin, North Wales; *Sapyga clavicornis*, a species which was regarded as extremely rare a short time ago, but which he had found at Solihull and various other midland localities, and which appeared to be a more common insect in the midlands than was supposed; also *Calicurgus hyalinatus*, one from Wyre Forest. Mr. G. T. Bethune-Baker showed two drawers of *Satyrus*, including, among other good species, *S. pamirus* and *S. parisatis* from Turkestan; *S. aurantiaca* from the Caspian; and a very fine series of *S. abdelkader* from Algeria. Mr. C. J. Wainwright, a box containing *Chelosia* and allied genera of Diptera.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—*Annual Meeting*, *January* 15*th*, 1900.—The President in the chair. The Treasurer, Mr. H. Locke, presented his Report, which showed a balance on the right side. The election of officers resulted as follows:—President, S. J. Capper, F.E.S.; Vice-Presidents, B. H. Crabtree, F.E.S., and E. J. Burgess Sopp, F.E.S.; Hon. Secretaries, F. N. Pierce, F.E.S., and Fredk. Birch; Hon. Treasurer, Dr. J. Cotton; Hon. Librarian, Fred. C. Thompson; Council, Dr. J. W. Ellis, F.E.S., Herbert Massey, Rev. R. Freeman, R. Wilding, and H. Locke. The President gave an interesting address on his entomological experiences from boyhood. At his first school his passion for insects got him into scrapes, but when he removed to the Friends' School at Epping this same passion was fostered by some of the masters until it grew into a determined study. On coming to Liverpool he had very little time for collecting, but he became acquainted with Mr. Nicholas Cooke, Mr. C. S. Gregson, and other eminent entomologists. His (for a youth) exceptionally good collection of southern insects filled Mr. Cooke with delight, and was the means of increasing their friendship. Thus, when Mr. Capper at length found time for collecting, they made frequent excursions together to all the noted "localities" of the district, their chief rendezvous being Delamere Forest. His New Forest experiences next occupied Mr. Capper's attention. These and his friendship with the two Gullivers, father and son, he dwelt upon with much pleasure, telling some amusing anecdotes about the latter. He then mentioned his acquaintance with Mr. Alfred Owen, and the acquisition of that gentleman's collection, thus making his own one of the richest in England. Mr. Capper referred to the years 1855, 1870, and 1888, as having been made memorable by the appearance of *Deilephila galii* on the Wallasey sandhills. The last occurrence was further commemorated by a clever sketch by Mr. C. H. H. Walker, entitled "Liverpool Entomologists on the War Path." This the President described at some length. In conclusion, he referred warmly to the valuable friendships he had formed through the study of entomology, and the happiness he had derived from it personally. A vote of thanks to the President was proposed by Mr. H. Locke, and seconded by Mr. R. Wilding. Mr. H. B. Prince sent for exhibition an interesting case with the imago, cocoon, and pupal skin of *Cossus ligniperda*, and the hanging puparium of *Uropteryx sambucata*; also a box of sandhill Lepidoptera.—Fredk. Birch, *Joint Sec.*

The Entomological Club.—Since our last Report (Entom. xxxii. 49), meetings were held as follows:—December 4th, 1899, at Wellfield, Lingard's Road, Lewisham, the residence of Mr. Robert Adkin. January 16th, 1900, at the Holborn Restaurant; Mr. G. H. Verrall in the chair.—R. South, *Hon. Sec.*

RECENT LITERATURE.

Transactions af the City of London Entomological and Natural History Society for the year 1898. Pp. 68. Published by the Society, November, 1899.

Although rather late in appearance, the 'Transactions' of this Society just to hand are in no way behind previous volumes in the matter of interest. Besides the Reports of Meetings and the President's Address there are five papers, four of which deal with insects, and the first instalment of "The Fauna of the London District." The entomological papers are as follows:—"Some Cicadides," by Ambrose Quail (3 pp.); "On some Heredity Experiments with *Coremia ferrugata*," by Louis B. Prout (9 pp.); "Beetle Coloration," by H. Heasler (8 pp.); "Notes on the Broads," by H. Fuller (3½ pp.). The district list of Lepidoptera is that of Dr. F. J. Buckell, edited, with additions subsequent to 1893, by L. B. Prout. The present portion extends to thirteen pages, and enumerates one hundred and seventy-one species. The arrangement, except as regards the butterflies, is that of the 'Entom. Syn. List,' but the generic nomenclature is not in accordance with that list or any work on British Lepidoptera.

Fauna Hawaiiensis. By E. Meyrick. Vol. i. pp. 123–275, plates iii–vii. Macro-Lepidoptera. June 8th, 1899.*

In this Part are included all the Lepidoptera, "except the Pterophoridæ, Tortricina, and Tineina." 292 species (arranged under forty-nine genera) are described, of which 200 are new; of the former, 261 (= 89 per cent.) are endemic.

The geographical distribution of the genera and species is dealt with at some length, but although such considerations—particularly from a specialist—should receive every attention, due caution in the acceptance of the results is very necessary. Distant exposed,† several years ago, the empiricism of drawing "great conclusions in geographical distribution from generic calculations alone." The specific constitution of the islands is as follows:—

Caradrinina	51 species.
Notodontina	50 ,,

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* See also Entom. 1900, pp. 23–4.

† 1878, Trans. Ent. Soc. Lond. p. 173, "Notes on Some Hemiptera Homoptera."

Sphingidæ	7 species.
Papilionina	7 ,,
Pyralidina	178 ,,

The general resemblance of the Hawaiian fauna to that of New Zealand is very marked, and its origin seems to have been mainly South Pacific, with admixture of Asiatic and American forms. The author considers that the genera may be grouped under four successive periods of time, *viz.*:—

(1.) South Pacific in origin, *Sisyrophyta* and *Scoparia* being representative.

(2.) Possibly coincident "in time with the considerable extension of the Hawaiian Islands to the north-west, which seems to have once existed," with *Agrotis*, *Pyrausta*, &c.

(3.) Under "circumstances much as at present," with 18 genera.

(4.) Due probably "to the influence of the north-east trade winds," mainly consisting of wholly apodemic genera.

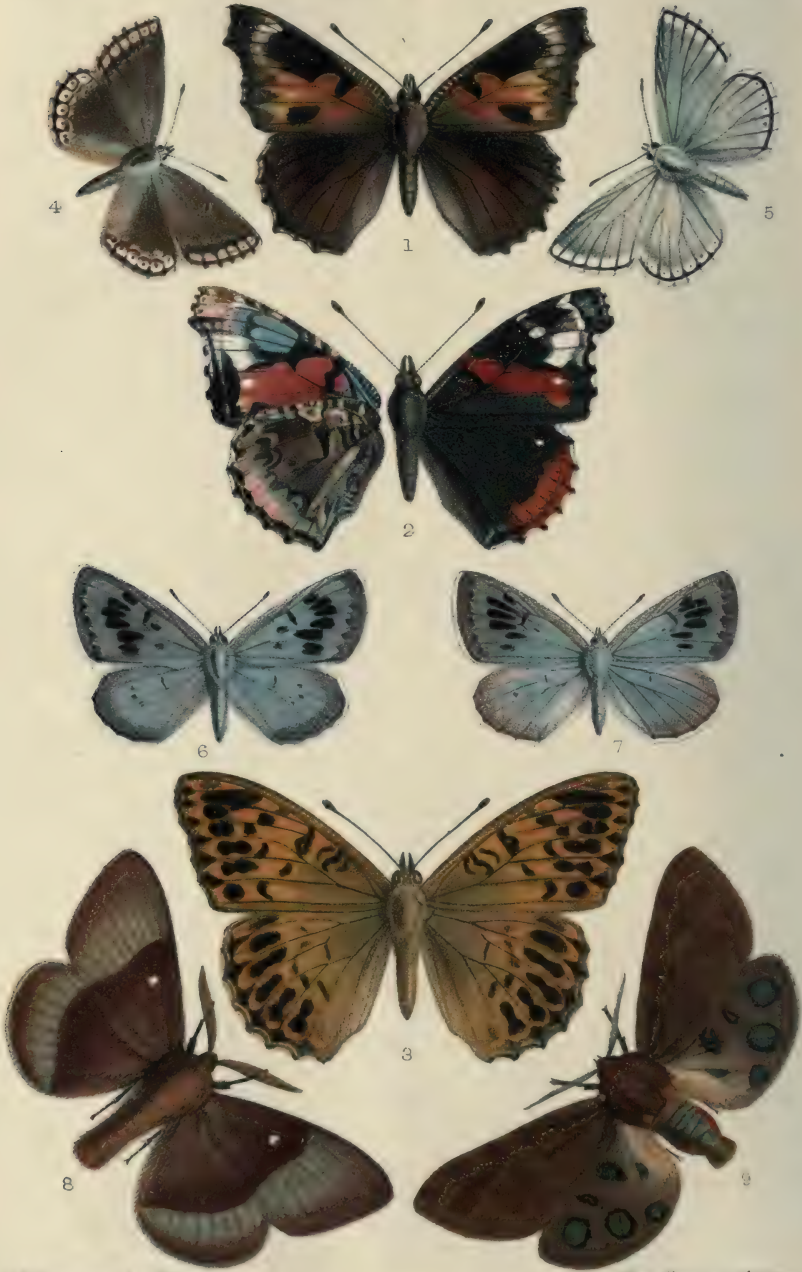
Of the 257 endemic species (261, less 4 whose distribution is unknown), 173 (= 67 per cent.) are confined each to a single island *; "of the remaining 84 species, 36 have been taken both in Hawaii and Kauai, at opposite ends of the group," and may therefore be counted as ranging throughout.

The author echoes the opinion of everyone who has dealt with any part of this fauna in noting the extraordinary variability, structurally and in colouration, of the species. "An unusual proportion of species show strong variability, which in perhaps 15 or more species becomes excessive. . . . The variation of such insects as *Hypenodes altivolans* and *Eucymatoge monticolans* is quite phenomenal, and the proportion of highly variable forms is certainly much larger than in an ordinary fauna." A tendency to dull colouring is noted, as also the fact that "in many of the Pyraustidæ there is an unusual tendency to increased development of the dorsal scale-projection towards the base of the fore wings, which is normally inconspicuous." Mr. Meyrick is of opinion, however, that the latter is of no importance as a test of relationship.

The endemic genera, that is to say, those whose species appear to be entirely confined to the Hawaiian Isles, contain two very remarkable forms, viz. *Scotorythra*, Butler, and "its derivate" *Sisyrophyta*, Meyrick. They are distinguished from the other genera of the Selidosematidæ by their peculiar antennæ, which, in the males, are bipectinate, simple towards the base and on the apical third; in the same sex the posterior tibiæ are more or less "dilated, containing hair-pencil in groove." Of *Sisyrophyta* 2 species are known, of *Scotorythra* 30 species. Lastly, we call attention to the genus *Scoparia*, Haw., of which no less than 57 species—26 figured—all (according to the author) remarkably constant, are found in the Hawaiian group.

G. W. K.

	Total No.	Peculiar Species.	Percentage.
* Hawaii	128	65	51
Maui	66	26	39
Lanai	32	5	16
Molokai	49	12	24
Oahu	51	17	33
Kauai	97	48	49



F.W. Frohawk del et lith.
West, Newman chromo.

Aberrations of British lepidoptera.

THE ENTOMOLOGIST

Vol. XXXIII.] APRIL, 1900. [No. 443.

ABERRATIONS OF BRITISH LEPIDOPTERA.

By F. W. Frohawk, M.B.O.U., F.E.S.

Plate III.

Fig. 1.—*Vanessa urticæ*, ♀. The fine example figured is one of two bred in July, 1896, from a brood of larvæ taken the previous month at Heathfield, Sussex, by Mr. A. W. Peach; both specimens are very similar in pattern. The whole of the remainder of the brood were normal. The one figured, now in the collection of Mr. A. B. Farn, has no trace of the usual blue marginal spots. The second and third costal spots of the primaries are united, forming a large black blotch, and the two usual central black dots are missing; the secondaries are unusually dark, having the upper central area black, and sprinkled with a few red scales in the centre of the wing; the basal half is clothed with fulvous down. On the under side the primaries are fairly normal, but the secondaries are uniformly dusky.

Fig. 2.—*Vanessa atalanta*, ♀. As variation in this species is of rare occurrence, I am pleased to be able to give a figure of such a handsome example as the one represented; it will at once be noticed that the character of the apical white markings is very unusual. The first costal blotch, which in normal specimens is by far the largest, is in this aberration narrowed and cut up into three small spots, the central one being reduced to a few white scales. The amount of white which should occupy this portion of the wing has apparently shifted its position lower down, forming a large white spreading blotch occupying the whole width between the lower radial nervure and second median nervule; below this on the red band is a comparatively large white spot spreading outwards into the black margin; at the

extremity of the red there are a few white scales forming an additional spot; surrounding the white apical blotches are patches of lavender-coloured suffusions, obliterating much of the black ground colouring. The secondaries are equally remarkable, or even more so, as they have a clearly defined white spot situated between the subcostal and upper radial, and the red marginal band is without the usual black spots. The under side exhibits even more beautiful variation than the upper. The costal third of the primary has a bright blue suffusion bordered with black, and most of the lower half of the wing is of a bright rose-red; the white of the apex is of much the same pattern as on the upper side, the great central area of the secondary is clouded with purple-brown and lilac, and towards the anal angle with various shades of lilac, metallic green, and blue; the marginal band is pink shaded with lilac over the apical third, and greenish over the anal fourth. This splendid specimen is unfortunately rather undersized, probably from the larva having had insufficient food in the last stage. It was bred by Mr. B. P. Kemp from one of only three larvæ casually found at Erith, and is now in the collection of Mr. E. Sabine, to whom I must offer my thanks for the loan of such a handsome specimen for figuring. I should add that he informs me that he bred over six hundred specimens of *V. atalanta* last autumn without obtaining anything special in the way of variation among them.

Fig. 3.—*Argynnis paphia*, ♀. As will be seen by the figure, the ground colouring is richer than in the normal female *A. paphia*, and more resembles the colouring of a male in this respect. The submarginal series of black spots are confluent, forming a conspicuous band of markings which become suffused into a large subapical blotch on the primaries; the markings over the median area of the wings, which in normal specimens are the boldest, are in this example much reduced in size. The under side presents no striking variation, excepting that the black markings on the primaries are considerably reduced. This fine butterfly, which is in very perfect condition, was captured on July 11th, 1897, in New Park Enclosure, New Forest, by Mr. A. W. Peach, who has kindly placed it at my disposal for figuring.

Figs. 6, 7. — *Lycæna arion*, ♀ ♀. These two handsome specimens have both been lent me by Mr. A. B. Farn, selected for the purpose of figuring from his superb series of the species captured by himself in Cornwall in 1896–7. These specimens, from their large size and bold markings, resemble a form of frequent occurrence in Germany; the markings on the primaries form a broad median band. The marginal series of spots on the secondaries in normal examples are absent in those figured, and the dusky margins blend into the blue, especially in fig. 7, which is without the central dots on the right secondary. The under sides do not show any noteworthy variation.

Fig. 8.—*Bombyx quercus*, ♂. This extraordinary aberration is also in the rich collection of Mr. Farn. It bears a label, "Bred by Purbrook, Brighton." The median pale band is of a light greenish olive, and gradually blends into the marone or purple-brown margin. The under side is similarly coloured to the upper, but somewhat paler.

Fig. 9.—*Arctia caia*, ♂. I am again indebted to Mr. Farn for the loan of this splendid insect, which he bred on Oct. 18th, 1899, from the ovum; the female parent was taken in July last at Greenhithe, Kent. The ground colour of the primaries is pale brown with an indistinct pattern of rusty brown, and dusky markings. The secondaries have the ground colour of a smoky grey-brown, darkest on the margins, and ochreous buff at the base along the inner margin; the metallic blue-black spots are normal, which give a peculiar and beautiful harmony of colouring to the specimen. On p. 33 of Newman's 'British Moths' a variety of *A. caia* is figured, apparently agreeing closely to the above.

January, 1900.

[Specimens of *V. urticæ* with the markings on the primaries somewhat resembling those in the example represented by Mr. Frohawk are figured in Newman's 'British Moths,' p. 52, and in the 'Entomologist' for 1896 (vol. xxix. p. 73); while a very similar aberration is depicted in the 'Iris' for 1890, pl. ii. fig. 6.

The extremely pretty aberration of *V. atalanta* from Mr. Sabine's collection very closely resembles an example of the same species from Jersey which was figured in the 'Entomologist' for 1893 (vol. xxvi. p. 27); but it still more nearly corresponds with a specimen figured in the volume of the 'Iris,' cited above (pl. ii. fig. 3). Neither of the last mentioned, however, have the white spot on the upper surface of the secondaries, and the under surface of each of them is far less variegated.

A male specimen of *A. paphia* from Germany in Mr. Leech's collection agrees very closely with the female aberration now figured by Mr. Frohawk.—Ed.]

LYCÆNA CORYDON VAR. *FOWLERI*, NOV.

Plate III., figs. 5 ♂, 4 ♀.

By Richard South.

Mr. J. H. Fowler (Entom. xxxii. 269) recorded the capture, on the Dorset coast in 1899, of some forms of *L. corydon.* As the descriptions of these varieties did not accord with any modification of the species with which I was acquainted, I wrote to him about them. In reply he most kindly sent me a fine series for examination, and for this courtesy I am very greatly obliged to him, as I am thereby enabled to have figured an exceedingly interesting form of *L. corydon.* The male examples with orange markings on the outer margin of hind wings are curious, but the most striking form is that represented by figures 4 and 5 on Plate III. In this form, of which there are six males and one female in the series, the remarkable feature is that the border of the outer margin is white instead of the usual black; the inner limit of this border is, on the fore wings, defined by a dusky shade, and the black nervules break up the border into six spots; on the hind wings four or five of the white spots are centred with black dots. Three other male examples and two females exhibit gradations between the form figured and typical *L. corydon.*

BUTTERFLIES COLLECTED IN THE SOUTH OF FRANCE, AND IN CORSICA.

By Henry Charles Lang, M.D., &c.

The places collected in last year were Avignon, near the Pont de Gard (one day only, June 16th); Digne, from June 18th to 23rd, and again from July 18th to 20th; Saint Martin Vesubie, from June 28th to July 7th; Corsica (Vizzavona and Bastia), from July 9th to 14th; Nice (Vallon obscur), June 25th and on July 15th; Annot, Basses-Alpes, one day, July 17th. I have referred occasionally to species taken in the spring of 1898.

Papilionidæ.

Papilio podalirius. — Generally common; Digne, abundant on Col de St. Vincent, St. Martin, Nice, Avignon. Not seen in Corsica.

P. alexanor. — First taken at Digne, June 20th; right bank of Bleone; afterwards, July 18th to 20th, abundant in a valley opposite the thermal springs. (Some specimens very large.) Three only at St. Martin.

P. machaon.—Digne, common in the same locality as *P. podalirius;* Nice, St. Martin.—Var. *aurantiacá.* Once at Vizzavona.

Thais medesicaste.—One specimen at St. Martin, June. A very late appearance.

Parnassius apollo. — Digne, common; St. Martin Vesubie, on the route de Madone. The commonest butterfly in many places.

P. delius.—St. Martin, at the Madone de Fenestre, 6000 ft.

PIERIDÆ.

Aporia cratægi.—Not rare at Digne, St. Martin, and Nice.

Pieris brassicæ.—Found in all the localities.

P. rapæ.—Found in all the localities.

P. napi.—Digne and St. Martin.

P. daplidice.—Digne and St. Martin.

Anthocharis cardamines.—Three or four at St. Martin.

A. euphenoides.—One specimen at Nice on June 25th. Late appearance. I found it at Digne, Nice, and St. Martin in May, 1898.

A. belia.—Too late for type, but it was common at Nice and Digne in May, 1898.

A. belia var. *ausonia.*—One at Digne, July 18th.

A. simplonia.—St. Martin, April and May, 1898; common.

A. tagis var. *bellezina.*—Over; it is locally common at Digne in April and May, 1898.

Leucophasia sinapis.—Found in all the localities.

L. duponcheli var. *æstiva.* — Digne, July 1st. The spring brood common at Digne, May, 1898.

Colias hyale.—In all the localities.

C. edusa.—In all the localities.

Rhodocera rhamni.—Digne and St. Martin.

R. cleopatra. — In all the localities but Corsica, where I did not see it.

LYCÆNIDÆ.

Thecla spini.—Digne and St. Martin; common.

T. ilicis.—St. Martin, Digne; very common; at Avignon abundant.

T. rubi. — Digne and St. Martin, abundant. (In April, 1898, I found this species and *Lycæna melanops* the commonest butterflies at Digne.)

T. roboris.—I took one specimen of this rare insect at St. Martin, and saw several others at the beginning of July. It was also taken by Miss M. Fountaine and Mr. Rowland Brown at Digne (Eaux-chaudes).

Polyommatus virgaureæ.—Common at St. Martin.

P. hippothoë var. *eurybia.* — Frequent in elevated meadows at St. Martin; route de Madone.

P. dorilis.—Digne and St. Martin; not very common.

P. alciphron var. *gordius.*—Digne, St. Martin, Annot.; common.

P. phlœas.—In all the localities; in Corsica as a dark form approaching var. *eleus.*

Lycæna telicanus.—A male and female at Nice, near the entrance of the "Vallon obscur," June 25th.

L. argiades.—Three specimens at Digne, June.

L. ægon.—In all the localities; generally common. At Vizzavona, Corsica, a small local form.

L. argus.—In all the localities.

L. orion.—Two at Nice. Commoner earlier in the season.

L. baton. —Digne and St. Martin; a few good specimens, but generally *passé.* It was very abundant at Digne in April and May, 1898.

L. eros.—One specimen at St. Martin.

L. icarus.—Common in all the localities. In Corsica with a light under side, and a very bright ante-marginal orange band on hind wings.

L. astrarche.—Digne, a few only.

L. eumedon.—One specimen at St. Martin.

L. amandus.—Fairly common at St. Martin, and two or three at Annot. Only one female.

L. escheri. — Abundant at Digne and St. Martin; settling in numbers on puddles in company with *Syrichthus carthami* and *Melanargia procida.*

L. bellargus.—Digne, St. Martin, Nice; not common.

L. hylas.—Digne, St. Martin; fairly common.

L. corydon.—Digne, Avignon, St. Martin.

L. meleager.—Common at St. Martin in some localities off the Nice road. At Digne the male abundant, female rare.—Var. *steevenii.* One taken on the Nice road between St. Martin and Roquebillière.

L. ripartii.—One at Digne, July 19th (hardly out).

L. argiolus.—Digne and St. Martin; not very common. At Vizzavona with a very light under side and small spots.

L. sebrus.—Only at Digne (getting worn), June; commoner earlier in the year.

L. semiargus. — Digne, St. Martin; common. A few at Nice and one in Corsica.

L. minima.—Digne and St. Martin; not common.—Var. *lorquinii.* Two males at Digne.

L. cyllarus.—Only at Digne, June; common earlier.

L. melanops.—A few at Digne at the beginning of my visit (it is very abundant at the end of April and in May).

L. arion.—Digne and St. Martin; locally abundant.—Var. *obscura.* Occasionally at Digne and St. Martin.

ERYCINIDÆ.

Nemeobius lucina.—Only three at Digne; rather worn.

LIBYTHEIDÆ.

None seen. *L. celtis* occurs at Digne, probably on cherry.

APATURIDÆ.

None seen.

NYMPHALIDÆ.

Limenitis camilla.—Common near the Pont de Gard, Avignon; also at Digne, flying near streams; none elsewhere.

Vanessa egea. — One at Digne, near baths; one at St. Martin, Venanson Road; and one at Vizzavona.

V. c-album.—Digne, St. Martin, Vizzavona.

V. polychloros.—Digne and St. Martin; not common.

V. urticæ.—In all the localities except Corsica. I was too early for *ichnusa*, which appears at Vizzavona about July 20th.

V. antiopa.—None on this occasion; hybernated specimens common at Digne, April, 1898.

V. io.—Not common; a few at Digne, and also at Vizzavona.

V. atalanta.—Digne, St. Martin, Vizzavona. At Digne it seems to emerge early in the season, as I found it fresh there in April, 1898.

V. cardui.—I only saw this once, at Vizzavona; probably too early for it.

Melitæa didyma. — Digne, St. Martin. One remarkable aberration at Digne, July 19th.

M. aurinia. — Was common at St. Martin in May, 1898 (var. *iberica*); a few worn specimens at Digne.

M. cinxia.—Three at St. Martin.

M. phoebe.—Digne and St. Martin; common. Annot (abundant).

M. parthenie.—Digne and St. Martin; not rare.

M. athalia.—Digne and St. Martin.

M. deione.—Digne and St. Martin; three or four.

Argynnis euphrosyne.—A few in the above two localities.

A. selene.—A few in the above two localities.

A. dia.—Only at St. Martin; not common.

A. amathusia.—St. Martin, above the Boreon waterfall, and Madone de Fenestre.

A. daphne.—Digne, near the baths; St. Martin, on the route de Madone, and Venanson Road; not common.

A. latonia.—Digne, Avignon, St. Martin, and at Vizzavona.

A. elisa.—At Vizzavona; fairly common in the pine forest, and on the road to Tattone.

A. aglaia.—Only at St. Martin, at high elevations.

A. adippe. — St. Martin; very large and bright at Digne. No *cleodoxa* seen.

A. paphia.—Digne, St. Martin, Vizzavona.

A. pandora.—One fine green-coloured female at Vizzavona, another at the railway station at the same place, a third seen on the station platform at Vivario.

SATYRIDÆ.

Melanargia galatea.—Digne and Avignon; mostly very common.—Var. *procida.* At St. Martin, where it is abundant, replacing type.

M. lachesis. — Six fine specimens at Avignon, near Pont de Gard, June 16th.

M. syllius—Too late for this species, which I found in profusion on Mount Boreon, and Villefranche, Nice, in May, 1898.

Erebia evias. — Only at St. Martin, at about 4000 ft.; locally common.

E. ceto.—In same localities.

E. euryale.—St. Martin; common locally.

E. stygne.—St. Martin; only one specimen.

E. epistygne.—Too late for this; common at Digne in April, 1898, on the Montagne de St. Vincent.

Satyrus hermione.—Digne and St. Martin; common.

S. circe.—Avignon, Digne, Annot; very common in the last locality.

S. neomiris.—Common between Vizzavona and Tattone, and in fresh condition.

S. semele.—In all the localities except Corsica, where it is replaced by var. *aristæus.* Vizzavona; not very common. Two at Bastia.

S. cordula.—Abundant at Digne, in same locality as *P. alexanor.*

S. fidia.—Digne; one fine specimen on outskirts of town, July 18th.

Pararge mæra.—St. Martin, common; in chestnut woods, &c.

P. megæra. — Common in all the localities except Corsica, where it is replaced by var. *tigelius;* common at Tattone and Bastia, a few seen at Vizzavona. Seems to prefer lower elevations.

P. egeria. — The typical form taken at Digne and in Corsica. At Nice and St. Martin it is much lighter, intermediate between *egeria* and *egerides.*

Epinephele ianira.—In all the localities.—Var. *hispulla.* At Digne, Nice, and in Corsica.

E. lycaon.—Digne; locally common.

E. ida.—Avignon, common; Nice ("Vallon obscur"), and at Bastia.

E. pasiphaë. — Only at Avignon, where it was common near the Pont de Gard.

E. tithonus.—Digne and Bastia.

E. hyperanthus.—Only at St. Martin.

Cænonympha arcanius.—Digne and St. Martin; common.

C. dorus.—St. Martin, but more abundant at Digne.

C. corinna.—Very abundant in Corsica between Vizzavona and Tattone. I did not seen it near the coast.

C. pamphilus.—Digne, St. Martin, and Corsica.

HESPERIDÆ.

Spilothyrus althææ.—One specimen of this not very common butterfly on the bank of the Rhone at Avignon.

S. lavateræ. — Digne, St. Martin, Nice; common on mountain paths, Annot.

Syrichthus carthami.—Common at Digne and St. Martin.

S. serratulæ.—Digne and St. Martin; rare.

S. alveus var. *cirsii.*—One at Annot.

S. sao.—Digne and St. Martin; fairly common.

Nisoniades tages.—A few seen at Digne.

Hesperia thaumas.—Digne and St. Martin; common.

H. lineola.—Digne and St. Martin; common.

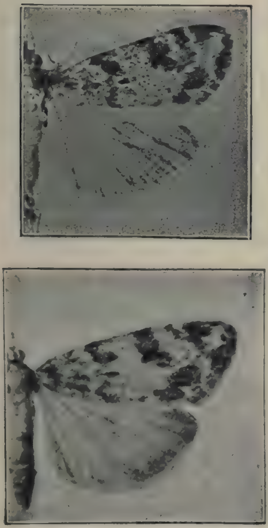
H. actæon.—Nice; abundant in "Vallon obscur"; St. Martin.

H. sylvanus.—Digne and St. Martin.

NOTES ON CERTAIN SCOPARIÆ.

By H. Guard Knaggs, M.D., F.L.S.

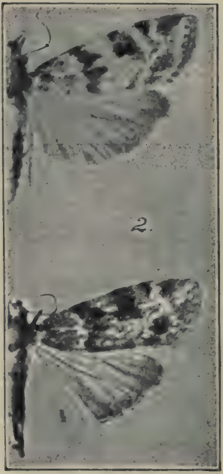
Though our best entomologists have, for considerably more than a quarter of a century, recognised *Scoparia atomalis*, Dbld., *basistrigalis*, Knaggs, and *ulmella*, Knaggs (Dale MS.) = *conspicualis*, Hodgkinson, as species distinct from *ambigualis*, Tr., there are still several who fail to distinguish the characters which separate them, the difficulty, as I pointed out many years ago, probably arising from the retention of poor specimens, and the mixing up of species in collections. It is therefore my purpurpose further on in these notes to suggest a method of regarding them which was found, in years gone by, to be very serviceable to my friends and myself, and which may in the future be useful to others; but first let us compare each separately with *ambigualis*, T., and begin with *atomalis*, Dbld., which most nearly approaches that species.



S. ambigualis, ♂ and ♀.

I am aware that those observant entomologists, Messrs. Bankes and Briggs, for whose opinion I entertain the greatest respect, having satisfied themselves as to connecting links between *ambigualis* and *atomalis*, regard them as identical; and certainly, in the gradations of their sombre tints, and the inconspicuity of their markings, their examination is very perplexing; but neither of these gentlemen makes any reference to the shape of the fore wings, which to my eye is, in *ambigualis*, broader transversely between the costa and anal angle, giving the wing a somewhat triangular form; while in *atomalis* the corresponding part is narrower, and consequently the wing appears to be proportionately longer. There also seems to be a greater difference between the respective fore wings of the sexes of *ambigualis* than in those of *atomalis*. To my fancy these insects, even when occurring in the same locality, whether in England (as Cumberland), Scotland (as Rannoch), or Ireland (as Sligo), may be separated by this character, not to mention, as a corroboration, the relation of the claviform stigma to the first line; for I quite agree with Mr. Bankes that, although it is about as unusual to find the claviform stigma attached to the first line in *ambigualis* as it is to find it detached in *atomalis*, the occurrence is not of a sufficiently constant nature, alone, to constitute a specific distinction. This character is much more reliable in such species as *murana*, and in less degree in *cratægalis*, though Mr. Meyrick applies it to *basistrigalis* and *ulmella*, which looks as if he had never seen these species, for in the former the detached claviform occurs so seldom (four or five per cent., say, and then perhaps only on one side), while in the latter it never occurs, so far as I am aware.

Perhaps it should here be mentioned parenthetically that some time ago my friend Mr. Sidney Webb kindly lent me the whole of his collection of this group, thus enabling me to compare hundreds of specimens from all parts of the United Kingdom.



S. atomalis, ♀ and ♂.

Then, again, *ambigualis* seems to be more variable in size than *atomalis*, southern specimens running larger, northern ones about the same size; but *S. dubiella*, Gregson, which I take to be a diminutive form of *ambigualis*, is much smaller than the least *atomalis* I have ever seen, its alar expanse reaching only seven lines. There are half a dozen of this dwarf form, with its dull and undefined markings and detached claviform stigma, in Mr. Webb's collection, but he is unfortunately unable to furnish positive information as to the locality in which they were captured, though he believes that the late Mr. Gregson probably took them in one of his favourite hunting-grounds, such as Cumberland, North Lancashire, Isle of Man, or North Wales. It would be very interesting to accurately locate the precise haunts of these puzzling little pigmies.

But if I am right in saying that *ambigualis* is the more variable in size, *atomalis* would appear to be the more variable in markings; the strongly marked specimens here figured hailed from Scotland, but the most striking varieties, in Mr. Webb's collection, are from the North of Ireland. In these the basal and apical areas are very dark, the medial area being of quite a light colour; whilst the tendency to leucomelanic variation in *ambigualis* is just the reverse, namely, dark in the medial area, light in the others. We also sometimes find a similar kind of variation in *basistrigalis*, *mercurella*, *ulmella*, *alpina*, &c.

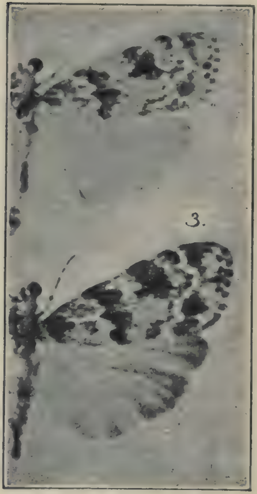
Again, *ambigualis* has a much wider range of distribution than *atomalis*, the former being ubiquitous from the northernmost Shetland isle to North and Central Europe; while of the latter, Cumberland is, I believe, the most southern limit. I throw out these hints for what they are worth, for, though I do not deny the possibility or even probability of these (let us say "forms") being identical, it does not at present seem to me advisable that my good friend the late Henry Doubleday's specific name "*atomalis*" should be dropped until something definite respecting their earlier stages has been worked out.

The figures here given are reproduced by shadowless photography, talc having been substituted in place of glass, which I recommended in a recent suggestion (Entom. vol. xxx. p. 265); the enlargement of all the figures is the same, namely, about two and a half diameters.

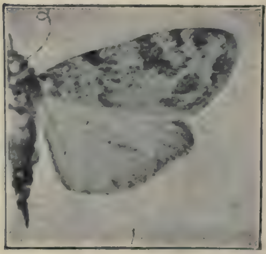
A comparison between *basistrigalis*, Knaggs, and *ambigualis*, Tr., is our next consideration. Your older readers will probably remember that in 1866 I described the former species in the pages of the E. M. M. (vol. iii. p. 1), and that I then drew attention to the greater width of the fore wing, its rounded apex and vertical hind margin; also to the oblique commencement of the angulated first line, the denticulated second line, the distinct basal streaks, the cilia neatly intersected with black squares, &c.

Messrs. Bankes (E.M.M. n. s. vol. i. p. 7) and Briggs (Entom. vol. xxii. p. 17; E. M. M. n. s. vol. i. p. 51), in their revisions of the Scopariæ, have not yet offered an opinion as to the identity of *basistrigalis* with, or its distinctness from, *ambigualis*, but suspend their judgment until they have seen the insect in a state of nature. Since then some very strong evidence in favour of the specific status of *basistrigalis* has been recorded; in fact, in the very next number of the E M. M. after my friend Mr. Briggs's communication, my old correspondent, Mr. G. T. Porritt, of Huddersfield, contributed a most interesting note (E. M. M. n. s. vol. i. p. 88) on the subject, from which I extract the following: "If Mr. Tutt, or any of your other correspondents who doubt the distinctness of *basistrigalis* from *ambigualis*, had seen the former in the numbers I and several other lepidopterists saw it in Edlington Wood, near Doncaster, on Aug. 4th, 1879, I fancy their doubts would have for ever been dissipated. . . . I remember distinctly that on seeing the first specimen on that occasion, although I had never seen the insect alive before, I at once recognised it as *basistrigalis*; and, on calling the late William Prest, of York, who was working some distance from me, he, on coming up and seeing the specimen on the tree, instantly said, '*basistrigalis*.' . . . Although I suppose I have seen thousands of *ambigualis* in all sorts of localities, I have never seen any I was inclined to suspect *might be basistrigalis*." Mr. Porritt refers also to its broader fore wings, as compared with allied species, and mentions its erratic disappearance from Edlington Wood. He adds that Mr. Prest subsequently took it in Bishop's Wood, near Selby.

About five years after this Mr. B. A. Bower, a gentleman who seems to have made *basistrigalis* one of his special studies, exhibited, at the Entomological Society of London, a wonderful series of varieties of this insect, which created great interest; and later on he contributed an excellent paper on the subject to the E.M.M. (vol. vi. n. s. p. 273). Mr. Bower has had plenty of experience with *basistrigalis*, and says:—"The shape of this species will always distinguish it from *ambigualis*, its fore wings, though narrow at the base, being decidedly broader than in that species, with a greatly arched costa, especially so in females. And, again, the time of its occurring would tend to prove it distinct, as, although there is actually no definite period between its emergence and the disappearance of *ambigualis*, the latter has become greatly diminished in numbers and in a dilapidated condition before *basistrigalis* puts in an appearance. Added to which anyone having seen the species in nature cannot but have been struck with the peculiarly robust look of the insect, due to the width of the united fore wings." Mr. Bower says that the moths are not uncommon in one or two Kentish woods, but in these are restricted to a very small area, and even then show a partiality for certain trees. He believes it not to be a moss-feeder, for the reason that he has failed to breed it by placing females in pots of growing moss, whereas *mercurella* and *cratægalis*, thus treated, breed freely. He does not agree with the theory that the variation is solely due to more succulent food or damp situation, because most of his captures, dark as well as light, were made in an abnormally dry locality—sand on a chalk subsoil. At the end of his paper Mr. Bower gives a very interesting enumeration of the variations of this species.



basistrigalis, ♂ and ♀.

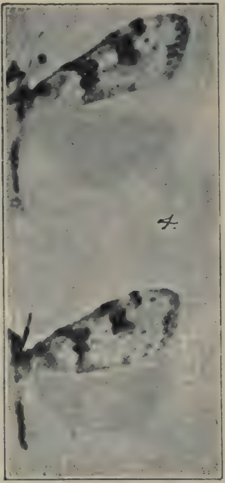


ambigualis, ♀.

Such testimony from two eminent lepidopterists, given quite independently of each other, ought surely to satisfy all who are open to conviction, but I do not despair of eventually bringing home to the minds of the most sceptical the fact that *basistrigalis* and *ambigualis* are distinct species. Ah me! I wish I could feel as I did twenty years ago, just for a season or two, that I might experience the delight of collecting the insect, and distributing it to all who cared to accept it, so that everybody should know it; as I did with *T. bondii* in days of yore; but, as I cannot do this, it will give me much pleasure to express an opinion upon any supposed specimens of *basistrigalis* which may be forwarded to me for the purpose, although no doubt it is better for the instruction of entomologists that they should each collect, and name their own captures.

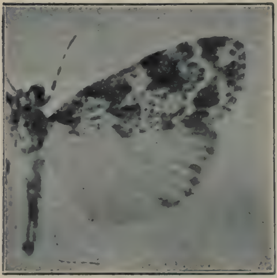
To those who would prefer to make their own comparisons between *basistrigalis* and *ambigualis*, I would draw attention to the following points: The greater alar expanse, particularly of the females of the former; the more rhomboidal shape of the fore wings, with their rounded tips and more vertical hind margins; the richer clothing of scales; the more ample hind wings, and their whiter, more pearly, and translucent appearance (through which, in a favourable light, you can distinguish the label beneath), as compared with the decidedly fuscous tone of those of *ambigualis;* this is very distinctive when a series of each, side by side, is inspected; the distinct basal streaks; the oblique commencement of the first line, from costa to orbicular stigma, which if continued would about bisect the anal angle, as compared with the less oblique commencement of the same in *ambigualis*, which if produced would arrive about the dorsal end of the second line; then the greater angulation of the first line, especially the middle angulation, which almost invariably meets the dash-like claviform stigma, is deeper and more acute than in *ambigualis;* the renal stigma more clouded with ochreous brown, the inner lower cornu of the × mark generally projecting basewards—not so in *ambigualis:* the more distinct denticulation of the second line, which is less inclined to conform to the lines which enclose an angle than in *ambigualis;* the neatly intersected cilia, and other little matters which I shall attempt to explain by and by, which should enable anyone "in the know" to separate these species at a glance.

As for *ulmella*, Knaggs (Dale MS.) = *conspicualis*, Hodgkinson, I do not think that anyone but Mr. Meyrick has been bold enough to assert that it is identical with *basistrigalis* and the others. It has always appeared to me that the sleek natty little *ulmella* was not very closely allied to any of our Scopariæ, but that on the whole it came nearest to *dubitalis;* and in my original description (E. M. M. vol. iii. p. 217, 1867) I placed it between that species and *mercurella* (and fine specimens certainly bear a remarkable though superficial resemblance to the "*phœoleuca*" var. of the latter), while my old correspondent the late Mr. Hodgkinson, who described it quite separately from me, and many years afterwards (Entom. vol. xiv. p. 223, 1881) under the name *conspicualis*, also remarked its affinity to *ingratella* (now considered to be a variety of *dubitalis*), and placed it between that species and *atomalis*. Mr. Hodgkinson made some interesting remarks as to its appearance in a state of nature. He noted "its peculiar light appearance when on the wing, which readily distinguishes it from any *Scoparia* but *S. pallida.* This may be easily understood by laying a specimen on its back. The under side is all alike, of a creamy satiny spotless white." Again: "It sits triangularly, and may be known from any other of the genus, when at rest, by the peculiarly distinct light first space, standing out as a white dot on the tree the insect is resting on"; hence, I presume, the name *conspicualis.* The imago appears July and August. Mr. Hodgkinson's captures were made at Windermere.



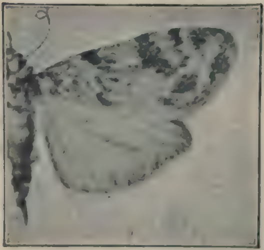
S. ulmella, ♂ and ♀.

On a former occasion (E. M. M. vol. vi. p. 41, 1869), Mr. Hodgkinson mentions that, fifteen years previous to his note, he took some Scopariæ on elm trees in Brockholes Wood, near Preston, which agreed with *ulmella.* They were, however, returned to him as *delunella*=*resinea;* but he was at the time satisfied that they were not that species. He adds that the trees were cut down after he made his captures, so that I suppose he did not meet with it again in that locality. It may be remembered that Mr. Dale's original specimens were taken off the trunk of a wych-elm in a thick wood at East Meon, adjoining Bordean Hanger, in July.



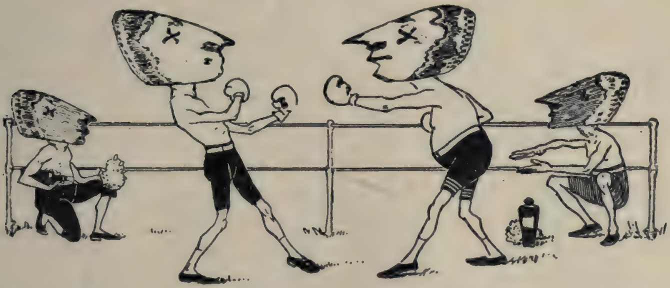
S. basistrigalis, ♀.

I do not know that I need refer further to the peculiarities of *ulmella,* except to observe that it is the first line which partakes of the character of that of *mercurella;* while it is the stigmata, and particularly the reniform and claviform, which, with their ochreous arrangements, remind one of *dubitalis,* and this is more especially observable in some specimens than in others. Unfortunately photography does not afford an accurate record of ochreous marks, and so we must do without them; but that does not matter, as we have ample evidence without them to show that *ulmella* is neither *basistrigalis,* nor *ambigualis,* nor *atomalis.* In comparing two or more species with one another, the same sex should be selected.



ambigualis, ♀.

I now propose to view these four insects as a group, and in doing so trust that your readers will take me seriously, for I can assure them that I am very much in earnest, though my methods may appear to be grotesque. If the student will look at the fore wing of either of these Scopariæ he will find that the middle and apical areas (that is, the space bounded by the first line, the costa (in part), the hind margin, and the dorsal margin (in part)) present the similitude of a human head, the features looking basewards; humanity, it is true, of a low type, with very receding forehead and deficient cranial development, but still sufficiently appreciable for the purpose we have in hand. The reader will see, by my rough caricatures below, to which I have got Mr. Victor Prout to put respectable bodies and limbs, the portion of the wing to which reference is made, and will be able to clearly define the forehead, eyebrow, bridge of the nose, lower border or septum of the nose, wing or ala of the nose, upper lip, mouth, lower lip, chin, jaw, and cranium, encased in head-gear. I have considered it enough to indicate the position of the eye (renal stigma) with a cross. The long narrow head of *atomalis* will be noted; the sharp nose, compressed lips, mouth projecting forwards, and the angulated chin of *basistrigalis* compared with *ambigualis;* and the short upper lip, the small mouth, and long straightish projecting chin of *ulmella* will be remarked; but of course, in their examinations, a little allowance must be made for individual variation, since no two animals or plants are ever exactly alike in every respect; the shepherd knows every sheep in his flock by the expressions of their faces; the striped ribbon fescue grass of our gardens, in some parts, goes by the name of "match-me-if-you-can." Now, what I want the student to do is carefully to compare, at first, the photographs accompanying this paper by the light of the suggestions made, and afterwards to examine actual specimens (decent, recognisable ones, mind), when I shall be very much surprised if he does not in future come to regard the Scopariæ with a new interest, and find these



S. atomalis. *ambigualis.* *basistrigalis.* *ulmella.*

physiognomies of great use in rapidly determining the various species of these insects.

In conclusion, I have to thank Messrs. Auld, Farn, and Gardner for kindly assistance with specimens.

Folkestone: February, 1900.

ON THE MORPHOLOGY AND CLASSIFICATION OF THE AUCHENORRHYNCHOUS HOMOPTERA.

By Dr. H. J. Hansen.*

Antennæ.

It is evident that in all the Auchenorrhynchous Homoptera, the antennæ are composed of a shaft (or peduncle) and a whip (or flagellum). The peduncle always consists of two considerable segments, of which the first at least *is always destitute of sensory organs;* the flagellum—its base included—is always much thinner than the second segment of the peduncle, and usually consists of several segments, but by amalgamation it sometimes appears to consist of a thicker short basal part, with a long thin tapering non-segmented apical bristle. There does not appear to be any noteworthy distinction between the two sexes in the sensory organs.

1. *Stridulantia.*

The antennæ are set in pits between the eyes right under the upper margin of the forehead (*frons*); they seem to be singularly uniform in all the species. The segments of the peduncle are simple; the first is more or less concealed, roofed over in the antennal pit, and is, at least usually, the longest; the second is *without sensory organs*, and is always considerably thicker than the first segment of the flagellum. The flagellum is fairly long,

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* This very important work was published in Danish in 1890, in the 'Entomologisk Tidskrift' (xi. pp. 19–76, two plates), under the title of "Gamle og nye Hovedmomenter til Cicadariernes Morphologi og Systematik," but scarcely any notice having been taken of it, among English-speaking rhynchotists at least, a free translation of the third, fourth, and fifth parts is now offered to the 'Entomologist.' The learned author, whose knowledge of English is almost as thorough as that of his native language, has been so kind as to look over my manuscript. The original paper, to which the interested reader is referred, was accompanied by two finely executed plates, containing more than fifty figures, illustrating the antennæ, claws, &c., of a number of forms. The more original portion of the paper which is now translated was preceded by a short personal introduction (pp. 19–22), and an historical *résumé* of the classification of the Auchenorrhynchous Homoptera (pp. 22–34). Dr. Hansen's new considerations are drawn principally from the structure of the antennæ and legs, and from the position of the spiracles. The generic and specific nomenclature used in this translation is identical with that in the original work.—G. W. Kirkaldy.

rather thick at the base, and tapering to the apex; it consists (see pl. i. f. 1,* representing *Cicada pruinosa*, Say) of *five long*, mutually almost equally long, segments; with a lens one can easily perceive the two or three basal (*always mutually long*) flagellum-segments, but in dried specimens the fifth is not always distinguishable separately.

On the under side of the first and second segments of the flagellum there is a very large number of sensory organs. Each of these consists of a pit, from the bottom of which sticks up a blunt spike; these organs are of two somewhat different forms. Some are considerable (fig. 1 a, m), the pits being remarkably wide in proportion to their depth; the spikes are stout, and project somewhat out from the pits. The others (fig. 1 a, n) are much smaller, the pits being narrow and proportionately deep; the spikes are slender, and scarcely project beyond the orifices of the pits.

On the three last segments of the flagellum I have found a few of the smaller kind of these organs.

2. *Cercopidæ.*

I have microscopically examined the antennæ of a Brazilian *Monecphora*, *Triecphora sanguinolenta*, *Aphrophora alni*, and *Philænus spumarius*, that is to say, representatives of the three groups into which the Cercopidæ were divided by Stål ('Hemiptera africana,' iv. 55). I have also examined with a strong lens two examples of *Machærota* (representing Stål's third group), and a large number of examples belonging to various genera of the first two groups. The antennæ have a very close mutual resemblance, both superficially and in their detailed structure, while at the same time differing considering from the other families. They are always placed in front of the eyes in pits on the forehead close beneath the margin, which, at least just at this place, projects freely, separating the vertex from the forehead. The second segment of the peduncle (pl. i. f. 2 and 3) is subequal to the first, approximately cylindric, *without sensory organs*, its broad distal end being cup-shaped. The flagellum consists of *a single, very thick basal segment, and an extremely fine tolerably long bristle*, which is not separated from the basal segment by any articulation in *Monecphora*, while it is somewhat indistinctly articulated in *Aphrophora*. The basal segment is short and obliquely oviform (or almost spherical), its basal part prolonged in a short thin stalk, by which it is fastened to the concave part of the second segment of the peduncle. It has a small number (from six to nine), near the apex on the one side, of simple proportionately very large sensory pits, each with a

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* These references are to the plates in the original paper, which should be compared with this translation.—G. W. K.

simple short spike; and one generally finds close to the apex two more or less short (*Triecphora* and *Philænus*) or long (*Monecphora*) thorns, which I have not been able to find in *Aphrophora alni*, in which I found, however, two big pits (f. 3 s), one on each side of the segment, resembling the fastening-place of the thorns, but of whose nature, however, I cannot say anything.

The flagellum has an absolutely different structure in the nymph stages from what obtains in the imagines. In *Philænus spumarius*, Linn., it *consists of seven segments* (pl. i. f. 4), which, with the exception of the shorter penultimate segment, are nearly subequal in length; the first is very stout, the others tapering towards the apex. The first segment bears a number of small normal sensory organs; similar ones are found also, but singly, scattered about on the 2nd–5th segments. The antenna of the adult is also clearly discernible within that of the nymph; the thick basal segment of the flagellum of the former occupies about half of the capacity of the same segment of the nymph, while the filiform part of the flagellum of the imago extends throughout the far thicker nymphal segment up to the apex.

3. *Jassidæ.*

Of this mighty family I have examined microscopically the antennæ of *Tettigonia ferruginea*, F., and *obtusa*, F., *Idiocerus populi*, L., male; *Typhlocyba rosæ*, L., *Acocephalus striatus*, F., *Paropia scanica*, Fall., *Ledra aurita*, L. (imagines and nymphs), *Ulopa reticulata*, F., *Æthalion reticulatum*, L., *Centrotus cornutus*, L., *Membracis tectigera*, Oliv., that is to say, representatives of most of the principal forms. I have examined with a strong lens all the other notable genera known to me.

The antennæ are placed in more or less distinct pits, which in some forms (*Tettigonia*, &c.) are situated before the eyes; but in others (*Idiocerus*, *Æthalion*, &c.) are placed *under* the eyes very much as in many Fulgoridæ. While they differ very greatly in the various genera, they possess nevertheless a certain family likeness which distinguishes them from the other families (pl. i. f. 5–10). The second peduncular segment is, as a rule, subequal to, or a trifle less than, the first in size. It is often peculiarly sculptured in a scaly-like manner, but is *always without sensory organs;* its apex never presents such a peculiar cup as that of the Cercopidæ. The flagellum is always clearly *multisegmentate*, in the first half of its length at least; it is sometimes short and very thick (*Ulopa*, *Centrotus*, *Æthalion*), sometimes long, or very long (*Tettigonia*, &c.), and very thin in the greatest part of its length; but its *oval, always somewhat—sometimes greatly—thickened basal part* (*Ulopa*) *has numerous transverse furrows* (or at least tends towards this owing to coalescence of some of the segments) *or consists of from two to six segments which are provided with a few simple sensory organs*, consisting of fairly deep small pits, which have a sensory-spike projecting from within. I have never found traces of sensory organs on the remainder of the thin bristle-like segment, except perhaps in the male of *Idiocerus*, in which the apical part of the flagellum forms a large flat oval plate (pl. i. f. 6), on which scattered points appear, which are perhaps peculiar, extremely small sensory organs, but of the nature of which I can say nothing, since my strongest magnifying power (600 times) was quite insufficient. In *Tettigonia ferruginea* (f. 5) the flagellum is very long and fine, except its somewhat thicker but still proportionately very slender sensory basal part (f. 5 a), which clearly consists of five segments, of which the three middle are the shortest, and the last—probably formed by the fusion of two segments—long. The remainder of the flagellum consists of a large number of segments, of which the proximal ones are short, the others longer; each one, however, is somewhat irregularly superficially divided into several extremely short segments (*false segmentation*). The last part of the flagellum is very thin, and in it every trace of segmentation has disappeared, In *Idiocerus populi* ♂ (f. 6) the sensory basal part of the flagellum is of the thickness of the same part in *Tettigonia*, and consists of six segments; the part between the basal segment and the recently mentioned "Palette" is not twice so long as the sensory part, and consists of eighteen to nineteen rather strong and to some extent regular segments, which are not again divided as in *Tettigonia ferruginea*. In *Ledra aurita* (f. 7) the basal part is very similar to that in *Tettigonia*, but consists, however, of only three segments, of which the last is very long. The apical section is shorter and thicker than in *Tettigonia*, but, however, tapers, and is divided from the base to about the middle into numerous small segments, while the remainder is quite without segmentation. In *Ulopa reticulata* (f. 8) the sensory part is extraordinarily thick throughout, and consists of two segments only; but the apical one is very long, and certainly corresponds with more than one in the last mentioned genera; the rest of the flagellum is also thick, though it tapers towards the apex; it is divided into sixteen normal segments, which increase in length towards the apex. In *Centrotus cornutus* (f. 9) the sensory portion is fairly thick, gradually tapering and badly separated from the distal part; its segmentation is not distinct, and is rendered more indistinct from irregular transverse stripes; the rest of the flagellum is coarse, consisting of numerous short irregular segments. In *Æthalion reticulatum* (f. 10) the flagellum is formed very similarly to that of *Centrotus;* the sensory section is, however, separated more distinctly from the rest, which is proportionately somewhat thinner. In *Membracis tectigera* the sensory parts are formed as in *Æthalion*, but are a trifle shorter, more oviform, and more distinctly separated from the proportionately longer and thinner apical part, which consists, as in *Ulopa*, of numerous regularly disposed segments. In *Paropia scanica* and *Acocephalus striatus* the sensory parts are slender and clearly divided into six segments; the rest of the flagellum is, in *Acocephalus*, almost identical with *Ledra;* in *Paropia* it is longer, and segmented regularly up to the apex.

In sexually immature forms (of which I have examined *Ledra* and two of our indigenous Jassinæ (sens. lat.)), the antennæ do not deviate in structure to any essential extent from the sexually matured.

(To be continued.)

DIPHYLETISM IN THE LEPIDOPTERA.

By A. Radcliffe Grote, A.M.

In letters to me Dr. T. A. Chapman proposes to call in the future my numbered vein "IX." of the fore wings in the Papilionides, "Grote's vein," since upon the presence of this vein I have based a separation of the swallow-tail group from the rest of the butterflies, and because also a name which is noncommittal is useful when applied to an organ the homologies of which are doubtful, as in the present instance. At the same time, Dr. Chapman suggests that this vein may be not the third anal, which from its position it might seem to be, but the fourth in the series of internal veins on the primary wing.

While in my original papers I disputed the homology of "Grote's vein" with the "fork" of the Hesperiades, which Prof. Comstock regards as the remains of the third pupal vein, it did not occur to me that it might be the fourth, since there seemed no space between "Grote's vein" at base and the second anal to admit of an intercalary longitudinal vein. In my paper on the "Descent of the Pierids," I have given a tentative sketch of a genealogical tree of the Hesperiad phylum, deriving it from an ancestry in which four anal veins on either wing were present, and which would conform with ontogeny. But this four-veined state, now observed in the pupal wing, represents in reality a common ground upon which the existing types of lepidopterous wings have arisen by specialization through reduction. That, in the Hesperiades, the fourth vein appears in the pupa, is no proof that the Papilionides have the same origin, since we have to do with a general character shown also by moths in ontogeny. It seems to indicate rather that the diurnal branch referred to sprang directly from a hypothetical Tineid-like ancestry, as I have suggested in the paper already mentioned. Thus the Hesperiades, Sphingides, Saturniades, Bombycides (Agrotides) are possibly converging groups. Now the hypothetical ancestor of the Papilionides must have already differentiated in the direction of retaining "Grote's vein" in the imago. But no other offspring appears, except what seems the probable culmination of the line in the existing swallow-tail group. If the fourth anal vein in the pupa of *Pieris* or *Vanessa* were really related to "Grote's vein," it would be succeeded in the imago by an arrangement of the inner veins, recalling that of *Papilio*. But it is not; and the resultant imaginal wing agrees in this respect with that of *Hesperia*. Perhaps survivals of the ancestry of *Papilio* may turn up among the lower moths of the tropics in the Eastern Hemisphere, where I look for the arising of the Papilionides to have taken place.

The neuration of the swallow-tails, especially that of the more generalized Ornithoptera, has a peculiar impress when compared with that of other butterflies. There is not the same tendency to approach the Hesperid type with divided veins, which we find, for instance, in *Charaxes*. The shape of the discal cell and arrangement of the median branches is *sui generis*. The object of my studies on the wings of the butterflies was really, however, attained with a demonstration that, in a linear arrangement, the swallow-tails cannot be intercalated between the "blues" and the "skippers," as proposed by Mr. Scudder and other authors. Also that the blues and skippers are, at whatever distance, connected groups. To show that the Lycænid wing was a natural development out of that of *Hesperia*, and that the wings of the Nymphalid and Pierid were both related and might have well proceeded out of the wings of ancestral forms of the Lycæni-Hesperid branch—this was the task set before me. If accomplished, it followed, without saying, that the Papilionides (which I also showed to be more specialized than commonly believed) should take the lead in our catalogues. But the matter has now gone further, and out of it has grown a question of diphyletism in the Lepidoptera, hitherto unbroached.

I do not recognize the relationship of the Papilionides to the Pieri-Nymphalidæ, as urged by Dr. Chapman or Mr. Quail, either on account of the retention of residuary characters, *i.e.* the cubital cross vein of primaries, or the first radial branch of secondaries closing outwardly the humeral cell, since these are common to the order; or on account of the retention of fourth anal of primaries in pupal wing of *Pieris* and *Nymphalis*, because this is also a common generalization, and in this case progresses by a disappearance in the imaginal state, not shared in by the Papilionides. The Nymphalids and Papilionides do not fit together; they appear disjointed, having attained diverse total stages of specialization. But all the groups of the Hesperiades seem to fit together.

The Papilionidæ and Nymphalidæ are in reality quite out of focus with each other. The specialization of the former is cubital, of the latter radial. The incongruity between the two should be felt by the naturalist. The correspondences are due, in my opinion, to convergence.

My general defence for my classification of the diurnals lies in the fact that we cannot interpolate the Papilionides at any point without breaking a continuous succession of forms having certain leading characters in common. My general defence for a diphyletism of the diurnals, not previously urged by any author, lies in the fact that the direction taken by the specialization of the anal veins in the Papilionides is unique. The families of the Hesperiades appear to converge in an ancestral type to the exclusion of the Papilionides. The convergence of the butterflies is already assumed by Dr. Chapman.

In the following table of characters, by which I separate the diurnals into two series, I do not undertake to settle the homology of the retained anal veins, and Dr. Chapman will, I hope, help us here. As I have pointed out, there is a law of inequality in specialization, in one and the same organ, here the veining of the wings. The development of one system of veins does not keep pace with another, nor is the ratio of advance the same as between the front and hind pair of wings.

In the Pseudopontiadæ three anal veins are retained on the hind wings, otherwise the specializations conform to those of the Hesperiades. Under the term Nymphalidæ I include the "brush-footed" butterflies, the Nymphalidæ proper, the Agapetidæ (Satyridæ), Morphidæ, Heliconidæ, and Limnadidæ (Danaidæ).

IMAGINAL WING.

A. Papilionides.

Fore wings with "Grote's vein" and second anal persistent; traces of first anal (submedian fold) as a scar seldom wanting.

Hind wings with one anal vein alone remaining.

Specialization of Media.

Cubital	Parnassiidæ Teinopalpidæ
Central	Papilionidæ

B. Hesperiades.

Fore wings with second anal only persistent, with a fork at base vanishing through reduction; traces of first anal as a scar oftenest wanting.

Hind wings with at least two anal veins persisting.

Specialization of Media.

Radial	Pierididæ Nymphalidæ Libytheidæ Riodinidæ
Cubital	Dismorphiadæ Megathymidæ
Central	Lycænidæ Hesperiadæ

It is hoped that the designations proposed by Prof. Comstock for the subcostal vein, the radius, cubitus, and anal veins will be permanently adopted.

The specialization of media is determined by the position of the second median branch. Its central position is the original, generalized state; it moves by being either drawn upwards and joining the radial, or downwards and then joining the cubital system of the wing. The specializations of the radius have been elsewhere fully discussed by me.

In the genealogical tree published by Sir George Hampson (1898) the Pierids are represented as having given rise to the Nymphalids and Satyrids. In their present condition the Pierids could not have done so, since the mass of forms have undergone a reduction of the radius, and are thus more specialized than the brush-footed butterflies, in which no such reduction has taken place. It is rather probable that the Pierids and Nymphalids are subparallel converging groups. The Pierids represent the main ascending six-footed stem, out of which the brush-footed butterflies proceeded probably as a side-issue, not as the culmination depicted by Sir George Hampson. The idea that the butterflies are represented by groups which run together, converge, we gather, with much other which is valuable, from Dr. Chapman. I adopt it to the exclusion of the Papilionides. I must also decline to accept the isolation of the skippers under a separate title, which would obscure their phyletic relationship to to the Lycænids. There will probably be no other differences in our views, which must be, to me, a source of congratulation.

In shortest phrase: all classifications and phylogenies, except my own, embrace the diurnal Lepidoptera in a single major group, the Rhopalocera, or separate from the rest the Skippers, under some similar title, holding the two as of equal morphological value. Dr. Chapman calls these same two groups—Papilionides and Hesperides; Comstock calls them Butterflies and Skippers. The only variation from this course is offered by those writers who allow the families of the diurnals to succeed each other, in a linear arrangement, without dividing them off by any special term or terms from the rest of the Lepidoptera. I, alone, divide the diurnals by separating from them, not the skippers, but the swallow-tails and the related Parnassians, as representing a distinct and closed group, possessing exclusive classificational and phyletic value, and which I call the Papilionides, or butterflies proper. And I allow of no separation of the skippers from the rest of the diurnals, which, gathered together under the name Hesperiades, or skippers in a wide sense, I regard as a group open to the moths, or Heterocera, and as not separable from these by any structural feature so strong as that which divides them from the Papilionides.

THE GENERA *CUPIDO* AND *LYCÆNA*.

By A. G. Butler, Ph.D.

Amongst Continental entomologists the genera *Cupido* and *Lycæna* are used indiscriminately, to indicate what are known popularly as blue butterflies, and particularly for the large untailed group.

When the typical "blues" are examined carefully, it will be found that they divide naturally into two genera—*Cupido* and *Lycæna*; the first with *C. arion* as type, the second with *L. meleager*. In neuration these two genera closely resemble each other; but, when examined with a platyscopic lens, it will be seen that, whereas *Cupido* is to all intents and purposes a naked-eyed genus, *Lycæna* has distinctly hairy eyes.

The importance of this character is vigorously insisted upon in the Heterocerous Lepidoptera, and doubtless should be equally valued among the Rhopalocera. I have therefore carefully examined the whole of the true "blues" in the Museum collection, with the following result:—

Cupido, *Schr.* (Eyes naked, or nearly so*).

C. arion, *C. euphemus*, *C. arcas*, *C. alcon*, *C. admetus*, *C. sebrus*, *C. lycea*, *C. pardalis*, *C. saportæ*, *C. celestina*, *C. nycula*, *C. galatæa* (perhaps a form of the preceding), *C. metallica*, *C. omphisa*, *C. donzelii*, *C. sæpiolus*, *C. anteros*, *C. eumedon*, *C. idas*, *C. astrarche*, *C. loewii*, *C. cleobis*, *C. zephyrus*, *C. triton*, *C. argus*, *C. scudderi*, *C. argyrotoxus*, *C. micrargus*, *C. melissa*, *C. eurypilus*, *C. optilete*, *C. acmon*, *C. hyrcana*, *C. shasta*, *C. alcedo*, *C. anna*, *C. christophi*, *C. sieversi*, *C. allardi*, *C. bracteata*, *C. staudingeri*, *C. psylorita*, *C. panagea*, *C. anisophthalma*, *C. cytis*, *C. dædalus*, *C. evius*, *C. heteronea*, *C. pheres*, *C. pheretes*, *C. asiatica ?*, *C. pheretiades*, *C. podarce*, *C. franklini*, *C. orbitulus*, *C. ægagrus*.

Lycæna, *Fabr.* (Eyes distinctly hairy).

L. meleager, *L. corydon*, *L. bellargus*, *L. hylas*, *L. ariana*, *L. icarus*, *L. persica*, *L. kashgariensis* (the two preceding are representative forms of *L. icarus*), *L. sutleja*, *L. amanda*, *L. eros*, *L. bilucha*, *L. pseuderos*, *L. candalus*, *L. helena*, *L. cyllarus*, *L. lycormas*, *L. semiargus*, *L. argiades*, *L. lygdamus* (I cannot distinguish this from *L. antiacis* or *L. couperi*; all three forms being very variable in tint), *L. melanops*, *L. erschoffi*, *L. damon*, *L. dolus*, *L. menalcas*, *L. hopfferi*, *L. phyllis*, *L. dama ?*, *L. admetus*, *L. posthumus*, *L. poseidon*, *L. damone*, *L. kindermanni*, *L. actis*.

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* In the *C. celestina* and *C. argus* groups, when examined under a fairly high power, a fine scattered short pile is visible upon the front of the eyes, but this disappears under a lower power, leaving the eyes apparently smooth.

In the preceding lists of species I have not included the recognized named varieties, seasonal forms, or slight local modifications, many of which are in the collection: there are also several hitherto unidentified species which I have been obliged to omit.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 82.)

Catoptria albersana, *Hb.*—Killarney.

C. ulicetana, *Haw.*—Everywhere abundant.

C. hypericana, *Hb.*—Wicklow Mts.; Belfast Hills, locally abundant (*W.*).

C. cana, *Haw.*—Howth; Markree Castle, Sligo (*K.*); Black Mountain; Belfast (*W.*); Derry (*C.*); Coolmore, Co. Donegal; and Armagh (*J.*); Roches Pt., Cork (*K.*).; near Sligo (*R.*); Letterfrack (*C. T. C.*).

C. fulvana, *St.*—Armagh (*J.*); Sligo (*R.*).

C. scopoliana, *Haw.*—Howth, Killarney (*K.*).; Bundoran, and near Belleek (*J.*); Sligo (*R.*); Westport, Mayo (*W.*); Ballinskelligs Bay, Kerry (*K.*); Favour Royal, Tyrone (*K.*).

Trycheris aurana, *Fb.*—Generally distributed.

Pyraloididæ.

Choreutes myllerana, *Fb.*—Holywood, Co. Down.

Symæthis oxyacanthella, *L.*—Abundant everywhere.

Conchylidæ.

Eupœcilia nana, *Haw.*—Powerscourt (*B.*).

E. dubitana, *Hb.*—Belfast (*W.*).

E. atricapitana, *St.*—Howth, and elsewhere on the Dublin coast, both on cliffs and sandhills, from mid-June to mid-August, but scarce; Belfast (*W.*); Roches Pt., Cork (*K*); Coolmore, Co. Donegal (*J.*); Sligo (*R.*).

E. pallidana, *Zell.*—Howth, N. Cooke, June, 1857; Magilligan, Co. Derry (*Curzon*).

E. maculosana, *Haw.*—Howth, Sligo (*R.*).

E. angustana, *Hb.*—Generally distributed.

E. mussehliana, *Tr.*—Sligo (*R*). Five specimens of this very rare species taken in a marshy field.

E. roseana, *Haw.*—Sligo (*R.*).

E. implicitana, *H. S.*—Belfast (*W.*).

E. CILIELLA, *Hb.*—Sligo (*R.*); Belfast, abundant (*W.*); Enniskillen (*P.*); Favour Royal, Tyrone (*K.*).

XANTHOSETIA ZOEGANA, *L.*—Generally distributed.

X. HAMANA, *L.*—Generally distributed.

ARGYROLEPIA HARTMANNIANA, *Clerck.*—Belfast Hills, locally abundant (*W.*); Clonbrock, Galway (*R. E. D.*); Sligo (*McC.*); Favour Royal, Tyrone (*K.*); Cromlyn, Westmeath (*Mrs. B.*); Coolmore, Donegal (*J.*).

A. CNICANA, *Dbl.*—Howth; Belfast (*W.*).

CONCHYLIS FRANCILLANA, *Fb.*—Howth, abundant.

C. STRAMINEA, *Haw.*—Howth, abundant; Belfast; Markree; Sligo (*K.*); Roches Pt., Cork (*K.*).

APHELIIDÆ, *Gn.*

APHELIA OSSEANA, *Scop.*—Howth and Wicklow Mts.; Armagh (*J.*); Sligo (*R*); Belfast (*W.*); Portrush (*C.*); Connemara (*C. H.*).

TORTRICODES HYEMANA, *Hb.*—Lambay I., off the Dublin coast.

TINEA.

EPIGRAPHIIDÆ.

LEMNATOPHILA PHRYGANELLA, *Hb.*—Belfast, abundant (*W.*).

DIURNEA FAGELLA, *Fb.*—Wicklow Mts., common; also at Belfast; Favour Royal, Tyrone; Drumreaske, Monaghan; Killynon, Westmeath; Tullamore, King's Co.; Killarney, &c. (*K.*).

SEMIOSCOPIS AVELLANELLA, *Hb.*—Wicklow (*G. V. H.*).

PSYCHIDÆ.

Little is known of the Irish distribution of the members of this group, which has been neglected largely, no doubt on account of the difficulties attending their identification. That only two species are recorded should not be taken as a proof of the poverty of this section of our fauna.

FUMEA INTERMEDIELLA, *Brd.*—Howth, the cases on the rocks in profusion (*G. C. B.*). At Wicklow Head, Ballycottin, Galley Head, and elsewhere on the cliffs of Co. Cork, and the Saltee Is. I have found immense numbers of what I take to be the cases of this species (*K.*).

PSYCHOIDES VERHUELLELLA, *Heyd.*—Killarney.

TINEIDÆ.

DIPLODOMA MARGINEPUNCTELLA, *St.*—Wicklow Mts., Sligo (*R.*); Magilligan, Co. Derry (*Salvage*).

OCHSENHEIMERIA BIRDELLA, *Curt.*—Portmarnock, near Dublin; Dingle Bay, Kerry; Holywood, Co. Down; Sligo (*R.*); Belfast (*C. G. B.*).

SCARDIA GRANELLA, *L.*—Dublin and Belfast.

S. CLOACELLA, *Haw.*—Dublin and Belfast; Markree Castle, Sligo (*K.*); and near Sligo (*R.*).

(S. ARCELLA, *Fb.*—Belfast. Old doubtful record.)

BLABOPHANES FERRUGINELLA, *Hb.* — Howth, on the cliffs; Sligo (*R.*).

B. RUSTICELLA, *Hb.*—Howth and Dublin, Armagh (*J.*); Belfast (*W.*); Sligo (*R.*).

TINEA TAPETZELLA, *L.*—Common everywhere.

T. MISELLA, *Zell.*—Dublin, in cellars and vaults among the matted growth of fungus on the walls.

T. PELLIONELLA, *L.*—Common everywhere.

T. FUSCIPUNCTELLA, *Haw.*—Dublin, common.

T. PALLESCENTELLA, *Sta.*—Dublin, Belfast (*W.*).

T. LAPELLA, *Hb.* — Belfast (*W.*); Rathowen, Westmeath (*Mrs. B.*).

T. MERDELLA, *Zell.*—Dublin, in houses; Belfast (*W.*).

T. CONFUSELLA, *H.-S.* — Howth, the only known British locality. It flits among and runs up the stems of the grass on cliffs, and possibly feeds on fungi in the same situations. It is somewhat remarkable that no other certain locality for this species should be known in the British Isles, and also that it has not for some years been taken here.

T. NIGRIPUNCTELLA, *Haw.*—Dublin, in houses.

T. SEMIFULVELLA, *Haw.* — Sligo (*R.*); Clonbrock, Galway (*R. E. D.*); Bray (*R. E. D.*).

TINEOLA BISELLIELLA, *Hml.*—Dublin, in houses.

LAMPRONIA QUADRIPUNCTELLA, *Fb.*—Howth.

L. LUZELLA, *Hb.*—Howth; Belfast, one (*W.*).

L. PRÆLATELLA, *Schiff.*—Killarney.

L. RUBIELLA, *Bjerk.*—Killarney and Holywood, Co. Down.

INCURVARIA MUSCALELLA, *Fb.*—Malahide, near Dublin; Wicklow Mts.; Belfast (*C. G. B. and W.*).

I. PECTINEA, *Haw.*—Killarney.

ERIOCEPHALA CALTHELLA, *L.*—Wicklow Mts.; Armagh (*J.*); Enniskillen (*P.*).

E. ARUNCELLA, *Scop.*—Sugar Loaf Mountain, Wicklow (*K.*).

E. SEPPELLA, *Fb.*—Generally distributed.

E. AUREATELLA, *Scop.*—L. Bray, Co. Wicklow; Blackstones and Killarney, Kerry; Enniskillen (*P.*).

(To be continued.)

NOTES AND OBSERVATIONS.

The Pupal Habits of Cossus ligniperda.—*Cossus ligniperda* is so common a species that one would suppose that even the most superficial among entomologists would be well acquainted with its life-history. That this is not the case is only too apparent from the notes that have appeared from time to time in the entomological journals, and I fear that on one simple point alone—namely, the natural situation selected for pupation—our knowledge is by no means clear. The older authors were unanimous in telling us that the pupal cocoon was formed in the burrow in which the larva had fed, but I find no evidence to support this theory; the most modern authors are equally assertive that the pupa is subterranean. In this gloriously uncertain state of our information, I was well pleased at finding, in June and July last, a considerable number of imagines, so freshly emerged that their wings were but partially expanded, and in almost every case the pupæ-skins that they had just vacated were also found. The trees in which the larvæ had fed, and which I have known for some years to be infested, grow just within a low park paling that surrounds a small garden. The bottom of the paling having become rotten, an oak skirting some six inches in depth has been fixed along the fence from post to post. This skirting rests on an asphalt path which borders the paling on the outside, and its bottom is also on a level with a flower-bed that traverses the inner side of the paling. A narrow space between the skirting and the paling forms a sort of pocket, and this has in course of time become filled with dust and twigs and so forth, forming a compact mass of dry rubbish, and from the surface of this the pupæ-skins were protruding. Some years ago I found a number of pupæ in a very rotten willow-tree, not, however, in the mines in which the larvæ had fed. By way of experiment, I have on several occasions placed full-fed larvæ, found in the autumn, in holes bored for their reception in a poplar-tree. Those thus placed in the dry stump of a limb, the upper portion of which was cut off some years ago, have invariably produced imagines in the following summer, but one similarly treated in the growing wood died. These facts, coupled with such other precise evidence as I have been able to obtain, suggest to my mind that the pupa is not necessarily subterranean, at any rate in the sense that many of the Sphingidæ and Noctuæ are, but that the larva is guided in the selection of a suitable situation for pupation rather by the presence of light friable material, be it rotten wood, dry turf, or other fibrous earthy matter, that will enable it to form its large tough cocoon.—Robert Adkin; Lewisham, February, 1900.

Cossus ligniperda Larva.—In the middle of February last a man brought to me two larvæ of *C. ligniperda*, each about 2¾ in. in length, which he had dug up in his garden that day. He told me that they were both contained in the same spadeful of earth; with the larva was brought one cocoon (broken), formed, as usual, of silk and earth. It contained fragments of a recently cast larval skin. One of the larvæ was of a uniform canary-yellow colour, the usual orange band on the dorsum being absent. This was apparently the larva which had owned the cast skin. Is it not very unusual for *ligniperda* larvæ to moult within the cocoon sometime previous to pupation? Is the close propinquity of the two larvæ underground, each presumably occupying a separate cocoon—one not being observed by the gardener—merely a coincidence, or has that apparent display of sociability been noticed before?—Dr. May; Hayling Island.

Dwarf Rhopalocera.—In the spring of 1896, during a stay in Guernsey, I captured a dwarf specimen of *Pieris napi*. It measured exactly 34 mm. in expanse. It was flying on low marshy land.

In a certain part of the woods overlooking Weston-super-Mare I have come across very small male specimens of *Euchloë cardamines*. The one I have in my collection measures 38 mm. in expanse. The whole form of the insect is different from ordinary specimens; in fact, except in colouring, the insect puts one in mind of *Leucophasia sinapis*, both in shape and in delicacy of construction. I have seen several flying about the same spot.—J. L. Saxby; Larkfield, Kent.

Referring to Mr. Cardinall's capture of a couple of dwarf *V. atalanta* and the editorial note on same, appearing in your last issue, it may be of interest to state that, in August, 1899, I discovered in a solitary bed of nettles, situated in an exposed spot, a quantity of pupæ, in appearance those of *V. atalanta*, but in size resembling *V. urticæ*. The fact that hosts of small ichneumons were emerging from one of the pupæ led me to believe that the whole of them were ichneumoned, assuming them to be *V. atalanta*. I determined, however, to test this theory, and took all the pupæ I could find—about three dozen. In the course of a week or ten days emergences commenced, and from all the pupæ but two ichneumons were bred. The two exceptions produced perfect imagines of *V. atalanta*, but of the size mentioned by Mr. Cardinall. Probably similar attacks by ichneumons result in the development of the dwarf specimens met with on the wing.—A. Russell; The Limes, Southend, Catford, S.E.

Naturalized Cockroaches.—*Phyllodromia germanica*, one of the four exotic cockroaches which have established themselves in the British Isles, swarms in an old house at Blackheath. This is yet another addition to the rather lengthy list of positions it has seized, which are usually hotels and restaurants. Another of the four, *Blatta americana*, is thoroughly established in a sugar refinery at Silvertown, a locality from which it does not seem to have been previously announced.—W. J. Lucas; Kingston-on-Thames.

Humming Sound of Macroglossa stellatarum. — I was rather interested in Mr. Anderson's note on the above (Entom. xxxii. 306), as I came across an instance of the same thing when at Wei-hai-wei in 1898. This, however, was out of doors, the moth being at the time poised over flowers on a hillside. The sound was very audible, reminding one of a *Bombus*, but louder and deeper.—T. B. Fletcher; H.M.S. 'Centurion,' Jan. 31st, 1900.

A Correction.—In view of the interest now taken in the insect fauna of the London district, it may be as well to correct the following error:—In the 'Entomologist,' vol. xxiv. p. 281, under *Gonoptera* *libatrix*, for "larvæ on willow and balsam," read "larvæ on willow and balsam poplar."—Alfred Sich; Brentwood, 65, Barrowgate Road, Chiswick, Feb. 21st, 1900.

CAPTURES AND FIELD REPORTS.

Remarkable Appearance of Vanessa io during Snow. — In the 'Field' of February 17th, Mr. E. J. P. Magor states that, while woodcock shooting in a small wooded valley at St. Tudy, Cornwall, on Feb. 14th, he came across a peacock butterfly (*V. io*). "It was of course one that had hybernated, but, considering the fact that there were four inches of snow on the ground at the time, its appearance was remarkable." In reply to my enquiries under what conditions the specimen was observed, the following reply from Mr. Magor appeared in the 'Field' of March 3rd:—"In answer to Mr. Frohawk's questions as to the peacock butterfly which I saw in the snow last month, I may say that the sun was shining brightly at the time, and the temperature was, I should think, comparatively high. The butterfly got up from a bush and flew along in front of me as I went up the valley. I saw it three times." I think such a very remarkable occurrence as this should be placed on record in the 'Entomologist.'—F. W. Frohawk; March, 1900.

Early Appearance of Pieris rapæ.—My sister, Miss I. Grant, writes to me from Weston-super-Mare, that at noon, on March 10th last, she observed a small white butterfly fly from under the coping of a wall in her garden; it flew close up to her. The sun was shining brightly at the time and very warm. The wall faces south, and is fully exposed to the sun. It had evidently just emerged from the pupa. Under the coping she states that there are many remains of pupæ-cases. — Margaret Frohawk; March, 1900.

Coremia quadrifasciaria at Bexley.—As the above insect is, I believe, a somewhat local species, I thought it might be of some interest to record a specimen taken by my father at Bexley, on July 16th, 1899. This was left out of my notes (*ante*, p. 48) by an oversight.—F. M. B. Carr; 46, Handen Road, Lee, S.E., March 15th, 1900.

Captures at Light in 1899.—According to custom I send a list of fresh records for light-trap during last year. The last season was an exceptionally bad one, only twelve *Asteroscopus sphinx* putting in an appearance, as against one hundred and fifty to two hundred in other years. The following are new:—*Lycæna astrarche, Acronycta psi, Axylia putris, Hecatera serena, Eupisteria obliterata, Bupalus piniaria, Eupithecia oblongata, Eucosmia undulata, Aciptilia pentadactyla, Crambus pinellus, Hyponomeuta padellus, Depressaria badiella, Coleophora lutipennella.* The following were exceptionally common, viz.: *Notodonta dictæoides, Demas coryli, Hypenodes albistrigalis, Cheimatobia boreata.* — E. F. Studd; Oxton, Exeter, March 19th, 1900.

Plusia gamma.—A fact which much impressed itself upon me during last season was the absence here of *P. gamma.* During several years this moth has been so abundant in Hayling as to be a perfect nuisance to the collectors. Last March I did not observe one specimen.—Dr. May; Hayling Island.

Euplexia lucipara in February.—On Feb. 25th, about 6 p.m., I found a female of the above species at rest on a piano in our drawing-room. I think this is probably a hybernated specimen, although the species does not usually pass the winter in the perfect state. It is somewhat worn, but was quite lively when captured.—Philip J. Barraud; Bushey; Heath, Herts, March 3rd, 1900

SOCIETIES.

Entomological Society of London.—*March 9th*, 1900.—Mr. G. H. Verrall, President, in the chair. Mr. H. Rowland-Brown, M.A., was elected into the Council, and as joint-Secretary in the place of Mr. J. J. Walker, R.N., who had resigned. Prof. Christopher Aurivillius, of Stockholm, and Prof. Frederick Moritz Brauer, of Vienna, were elected Honorary Fellows; and W. D. Drury, of Rocquaine, West Hill Park, Woking; the Rev. W. Westropp Flemyng, of Coolfin, Portlaw, Waterford; and Prof. Percy Groom, M.A., F.L.S., of the Royal Indian Engineering College, Coopers Hill, were elected ordinary Fellows of the Society. Mr. C. G. Barrett exhibited a series of varieties of *Spilosoma dorsalis* from South Africa, showing variation in some degree parallel with that of *S. lubricipeda* in Great Britain. Mr. G. W. Kirkaldy exhibited several Rhynchota of economic interest, from the United States, Ceylon, and British Central Africa, among them being the new *Ægaleus bechuana*, Kirk., from Africa, which attacks coffee, and *Parlatoria victrix*, Ckll., from Phœnix, Arizona, found on date-palms. The last-named Coccid was originally introduced from Egypt, and all attempts at eradication had hitherto failed. He also showed a series of thirteen colour-varieties of the oriental Scutellerine *Cantao ocellatus* (Thunb.), and examples of *Distantidea vedda* (a new genus and species of Lybantinæ) from Ceylon, in which the rostrum was very long, extending as far as to the apex of the abdomen. Papers were communicated, by Mr. W. L. Distant on "Undescribed genera and species belonging to the Rhynchotal family Pentatomidæ," and by Mr. G. J. Arrow "On Pleurostict Lamellicorns from Grenada and St. Vincent (West Indies)." Mr. C. J. Gahan read a paper on "Stridulating organs in Coleoptera," in which he remarked that one of the best accounts of them was to be found in 'The Descent of Man,' but since that work was written several additional instances of their occurrence had been made known, showing that these organs were less uniform in structure and even more wonderfully diversified in position than Darwin considered them to be; while their discovery in the larvæ of certain forms would lead to some modification of the view that they have originated in connection with sex and primarily serve the purpose of attracting the sexes to one another. He gave a detailed account of their presence on the head, prothorax, mesothorax, legs, abdomen, and elytra, enumerating several genera of Tenebrionidæ, Endomychidæ, Hispidæ, &c., in which they had not previously been known to occur, and describing those of certain Hispidæ as being the most complex in structure. He mentioned additional instances in which they occur in one sex only, or differ according to sex, and pointed out that, contrary to Landois' opinion, they are frequently present in both sexes of Curculionidæ; but in several species the striated area occupies a different position in each sex, being found on the elytra in the males and on the last dorsal segment in the females.—H. Rowland-Brown and C. J. Gahan, *Hon. Secs.*

South London Entomological and Natural History Society.—*Annual Meeting, January* 25*th*, 1900.—Mr. A. Harrison, F.E.S., President, in the chair. The Council's Report showed that the Society was in a sound condition, both in membership and finances, as well as in usefulness. The following gentlemen were elected as Officers and Council for the ensuing year:—President: W. J. Lucas, B.A., F.E.S. Vice-Presidents: H. S. Fremlin, M.R.C.S., F.E.S., and A. Harrison, F.C.S., F.L.S. Treasurer: T. W. Hall, F.E.S. Librarian: H. A. Sauzè. Curator: W. West. Hon. Secretaries: Stanley Edwards, F.L.S., F.E.S., and H. J. Turner, F.E.S. Council: R. Adkin, F.E.S., W. J. Ashdown, F. Noad Clarke, Dr. T. A. Chapman, F.E.S., H. Moore, F.E.S., A. M. Montgomery, and J. W. Tutt, F.E.S. The retiring President read his Address, discussing at some length the subjects "Recent experiments in Telegony" and the "Inter-relation between the Mosquito and Malarial Fever." Mr. Blenkarn, of East Dulwich, and Mr. Day, of Carlisle, were elected members. Mr. Brooks exhibited several specimens of *Acherontia atropos*, bred by himself, and radiated varieties of both *Arctia lubricipeda* and *A. menthastri*.

February 8*th*.—Mr. W. J. Lucas, B.A., F.E.S., President, in the chair. Mr. Ashdown exhibited, and presented to the Society's collections, male and female examples of *Gomphus vulgatissimus* from the New Forest. Mr. Montgomery, long bred series of *Chrysophanus phlæas*, and contributed notes on their life-history and variation. Mr. Moore, some one hundred and fifty species of Coleoptera collected by Prof. Blatchley in Indiana, including five species of *Calosoma;* an unnamed species taken at an altitude of 14,500 ft. on Mt. Orizaba, Mexico; and a Coccinellid, *Megilla maculata*, which congregates in thousands for the winter. Mr. Lucas, a specimen of *Gryllus campestris*, from Hastings last year, and a female dragonfly taken by Mr. Fremlin in the Hebrides, which was probably a variety of *Sympetrum striolatum*. Mr. Adkin, a series of *Melanippe fluctuata* taken at Lewisham in his garden and in a wood near. The latter were large and dark specimens. Dr. Chapman, a large number of microscopic slides of larval and imaginal lepidopterous legs to illustrate his paper entitled "On the Relation of the Larval to the Imaginal Legs in Lepidoptera."

February 22*nd*.—The President in the chair. Mr. J. W. Enock, of Charlton, and Mr. T. Kemp, of Notting Hill, were elected members. Mr. Tomlinson exhibited a specimen of *Eristalis tenax* and pupa from the Kingston sewage works, and suggested that the species may eventually take an important place in the purification of sewage. Mr. Lucas, several species of exotic Odonata, to show striking ornamentation of he wings. Mr. Adkin read a paper entitled, "Notes on the Pupation of *Cossus ligniperda*," and exhibited examples of the species taken at Lewisham in June and July last. Mr. Colthrup, a sawfly cocoon tenated by a spider. Major Ficklin reported the capture of *Macroglossa stellatarum* early in February in the city.—Hy. J. Turner, *Hon. Report Sec.*

Birmingham Entomological Society.—*February* 19*th*, 1900.—Mr. G. T. Bethune-Baker, President, in the chair. Messrs. F. A. Jackson, Edmund Street, Birmingham, and W. H. Wilkinson, F.L.S., Marchmound, Wylde Green, were elected members of the Society. Mr. R. C. Bradley showed the rare Chrysid *Cleptes pallipes*, which had been taken at a window of his house at Moseley, and the identification of which had been confirmed by Rev. F. D. Morice; also *Miltogramma conica*, a little Tachinid which he had found in abundance at Moseley last summer. Messrs. H. Willoughby Ellis and F. A. Jackson showed the following beetles from Knowle:—*Anchomenus viduus* and var. *mœstus*, *Aleochara brevipennis*, *Ptinus fur*, *Corymbites pectinicornis*, and *Sitones cambricus*. Mr. C. J. Wainwright, a box containing the genus *Syrphus* and allied Diptera. Mr. G. T. Bethune-Baker, a drawer of Palæarctic Satyrids.—Colbran Wainwright, *Hon. Sec.*

RECENT LITERATURE.

Celli, A. *Remarks on the Epidemiology and Prophylaxis of Malaria in the Light of Recent Researches.* ('British Medical Journal,' 1900, pp. 301–6.)

Everyone is doubtless aware of the investigations upon the causes of malaria which have been conducted by some of the most eminent specialists. The 'British Medical Journal' for Feb. 10th contains a number of articles upon the now proven relation of mosquitos (*Anopheles*) to malaria, the principal of which is that cited above, a summary of three works in Italian by the same author. There are also reports of the Malaria Conference in Rome, and a translation of Dr. Koch's Second Report upon the work of the Malaria Expedition in the Dutch East Indies. As no notice has lately occurred in any of the British entomological journals, some extracts and notes may be of interest.

"Man is the temporary host, and the mosquito the definitive host, of the malarial parasite. These parasites complete their asexual life and prepare their sexual forms in the human blood, while they complete the sexual cycle of life, that by which the species of the parasites external to man is assured, in the middle intestine of the mosquitos. It follows therefore that man and mosquitos are the sources of malarial infection which circulates, so to speak, from man to mosquito and from mosquito to man, and so on. In this circulation of the contagion the presence of malarial man is indispensable, inasmuch as down to the present time the hereditary transmission of malaria from mosquito to mosquito has not been demonstrated experimentally or morphologically, nor have resisting parasitic forms been found in the environment external to the body of the mosquito. Malaria is therefore a sypical contagious disease. Where there is malaria mosquitos abound, but malaria does not exist in every place where mosquitos abound." The malaria-infesting genus is *Anopheles*, which has four Italian species. It is improbable that *Culex* and other Diptera frequenting malarious places can transmit malaria.

The species of *Anopheles* lay their eggs in clear, slowly running or stagnant water, where the eggs and nymphs of *Culex* are rarely, if ever, found. Sea-water, very strong sulphurous water, continuous ice, or swiftly moving water is injurious to the immature forms.

The following parallel columns will succintly show the theory and the facts relative to the mode of propagation:—

1. The infection is most rife at sunset and during the night.	1. *Anopheles* issues forth in the evening and night to pierce man, but lies hidden during the day.
2. Is limited in distance in horizontal, oblique, and vertical directions.	2. Does not fly far from native place, and does not fly high in the air.
3. Is not transported by wind, which, on the contrary, tends to diminish it.	3. Usually remains hidden when the wind blows.
4. "Woods, instead of filtering the malarial agents, may be foci of this infection."	4. "Shady or damp woods and trees in general are the homes of mosquitos."

Water, as proved by a long series of direct experiments, is not the vehicle of malarial infection, neither are alimentary substances. In fact, the malarial parasite *Proteosoma* is introduced in the human blood by the mouth-parts of the infected *Anopheles*. [Extracts, &c., from Celli's paper.] Dr. Grassi is of opinion that man cannot contract malaria without being "bitten" by *Anopheles*, and "No man, no malaria; no mosquito, no malaria." Grassi's work on the malaria parasite, at which he has been labouring for sixteen hours a day for eighteen months, will be published very shortly.

Dr. Koch considers that the proposal recently made to destroy *Anopheles* larvæ will meet with insuperable difficulties in Java, since the more rice fields there are in the neighbourhood of a place and the nearer they are, the greater the abundance of *Anopheles;* the occurrence of the mosquitos being connected with the extension of rice culture.

It has been possible only to give a very brief and disjointed notice, but the interested reader is referred to the journal quoted (which is published at 6*d*.).

G. W. K.

MONTANDON, A. L. *Hemiptera Cryptocerata. S. Fam. Mononychinæ. Notes et Descriptions d'Espèces Nouvelles.* (Bull. Soc. Sci. Bucarest, part 1, 1899, viii. Nos. 4 and 5, pp. 1–18; part 2, 1900, viii. No. 6, pp. 1–10.)

IN this welcome revision of a difficult and neglected group, Dr. Montandon admits only three genera into the subfamily. The species are all extra-British, and of a more or less undistinguished appearance; but they merit a close examination, and should be of interest to the local student, inasmuch as they undoubtedly provide information as to some of the stages through which the completely aquatic Naucorinæ have passed in their evolution from land-bugs, originally probably from some form similar in structure and appearance to *Acanthia*, Fabr., Latr. The genera admitted are :—

1. MONONYX, Lap. = *Phintius*, Stål, with 18 spp. (7 new).
2. MATINUS, Stål, with 5 spp. (3 new).
3. PELTOPTERUS, Guér. = *Scylæcus*, Stål, with 3 spp. (2 new).

Mononyx has a very wide distribution, seven species occurring in America, five each from the Oriental and Australian regions, and one from the Ethiopian; the other genera are much restricted, *Matinus* being entirely Australian, while *Peltopterus* is insular, having been recorded only from the Philippines, North Borneo, Salomons, Mariannes, Mauritius, and a few smaller islands. The genus *Nerthra*, Say, from America, remains unknown.

The value of Dr. Montandon's precise and uniform descriptions is greatly enhanced by the synoptic tables, in which structural characters are employed for the preliminary differentiation of the species; but there are unfortunately no figures, a want which cannot always be supplied even by the most careful and detailed descriptions.

G. W. K.

SLATER, F. W. *The Egg-carrying Habit of Zaitha.* ('The American Naturalist,' 1899, xxxiii. pp. 931–3.)

IT has been long known that certain American waterbugs of the family Belostomatidæ, particularly *Zaitha fluminea*, Say, and *Deinostoma* (= *Serphus*) *dilatatum*, Say, have the habit of carrying their eggs on their back until they are hatched, and it has always been taken for granted that the female is the egg-carrier. Miss Slater, however, has made a study of the sexual organs of *Zaitha*, and finds that everyone of the egg-carrying individuals which she has dissected is a male, and that the ovipositor of the female is so short that it would be impossible for her to reach her own back with it.

The ovipositing season lasts from June to the end of August, and the eggs, which are comparatively of large size, number from seventy-five to eighty-five, "placed in regular diagonal rows on the upper side of the wings of the male." The male is an unwilling porter, and is captured by the larger female and compelled to endure the indignity, after a series of well-contested combats. "That the male chafes under the burden is unmistakable; in fact, my suspicions as to the sex of the egg-carrier were first aroused by watching one in an aquarium, which was trying to free itself from its load of eggs, an exhibition of a lack of maternal interest not to be expected in a female carrying her own eggs. . . . For five hours I watched a silent unremitting struggle between the male and the female. Her desire was evidently to capture him uninjured. She crept quietly to within a few inches of him, and there remained immovable for half an hour. Suddenly she sprang towards him; but he was on the look-out, and fought so vigorously that she was obliged to retreat. After this repulse she swam about carelessly for a time, as if searching for food was her only thought. But in ten or fifteen minutes she was back in her first position in front of him. Again there was the attack, and again the repulse. The same tactics were continued until midnight, when, despairing of her success, I left them. At six o'clock the next morning the entire abdomen of the male and half of the thorax were covered with eggs. Those nearest the head were quite yellow, showing that the struggle had just ended."

It is to be hoped that the fair American will continue her observations. The reason for this strange disposal of the eggs is problematical; it can scarcely be for their safety, since the male, if attacked, "meekly receives the blows, seemingly preferring death, which in several cases was the result, to the indignity of carrying and caring for the eggs."

G. W. K.

Second Annual Report of the Kendal Entomological Society. Session 1899.

The present Report of this enterprising and, we are pleased to say, flourishing Society, comprises twelve pages. The contents include the President's Address and a paper entitled "Directions for Setting Lepidoptera." The former is a review of the work done by the Society collectively and its members individually during the year; the latter, which is contributed by Mr. Frank Littlewood, is an instructive and practical article.

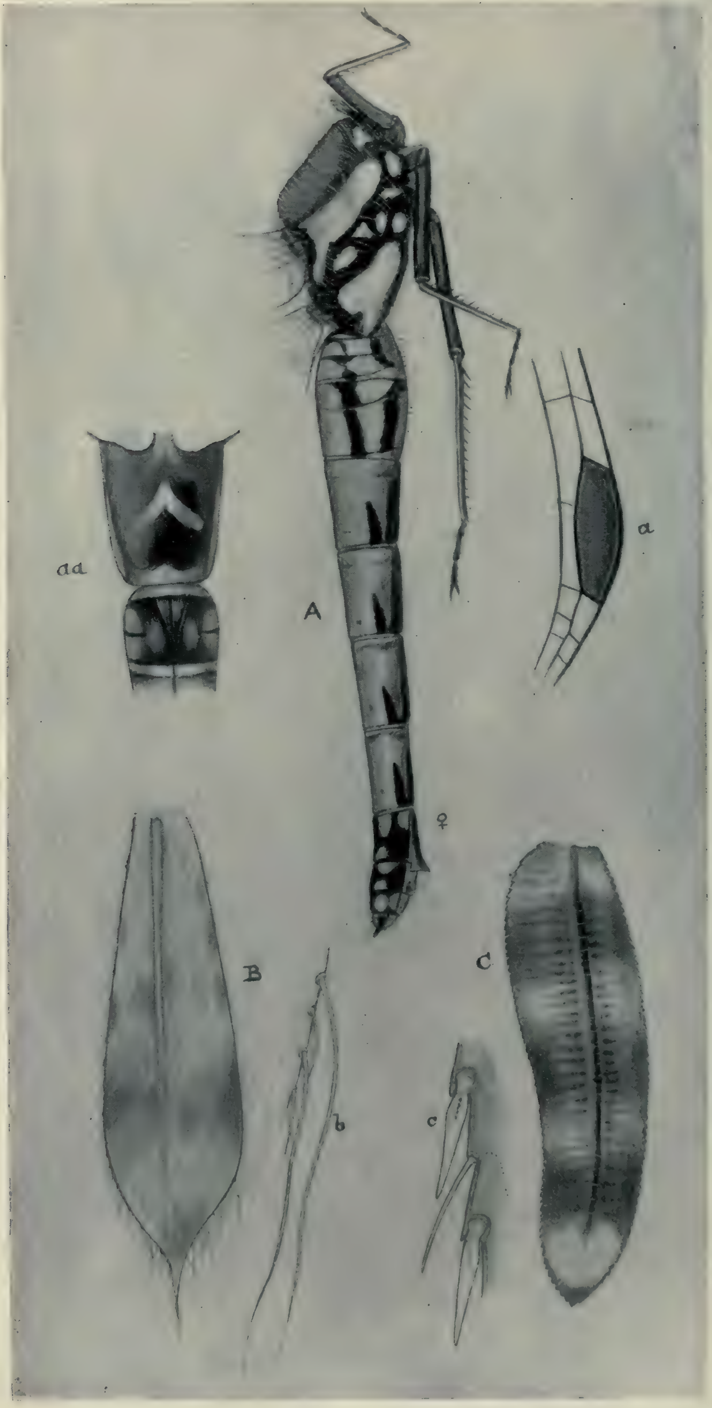
OBITUARY.

We regret to announce that Mr. W. G. Blatch, of Knowle, near Birmingham, died on Feb. 24th last.

Mr. Blatch was born in London; we are unable to ascertain the exact date, but we believe that it was about 1840. His education as a boy was not framed on a very liberal scale, but he appears to have been a great lover of books, and quickly assimilated their contents; and he also instructed himself in, among other subjects, Latin and Greek. Having tried shoemaking, a business that proved not altogether to his liking, he became a pupil-teacher in a school at Colchester; subsequently, however, he relinquished this in favour of an appointment in the Essex Hall Idiot Asylum. We next hear of him as one of the first of the "Evangelists" sent out into the rural districts by the late Samuel Morley, M.P. Finally, he was appointed Secretary to the Midland Counties Idiot Asylum, on the foundation of that institution about thirty-two years ago; this office, combined with that of Superintendent, he retained until the date of his death.

Although it was as a coleopterist that Mr. Blatch was best known among entomologists, he was interested in all orders of insects, and a true lover of nature. Most of his published entomological writings will be found in the 'Entomological Monthly Magazine.' He also wrote an article on insects for the 'Guide to Birmingham,' which was published for the British Association Meeting in 1886. For many years he had been engaged on a list of the Coleoptera of the Midlands, but this, unfortunately, has not been published.

Mr. Blatch was elected a fellow of the London Entomological Society in 1890; he was one of the founders of the Birmingham Entomological Society (established in 1888), and occupied the chair for the first five years.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DRAGONFLY SEASON OF 1899.

By W. J. Lucas, B.A., F.E.S.

Plate IV.

Owing to the ungenial weather in April and May the dragonfly season, as in 1898, was late in commencing. In an early year several species would be on the wing in the South of England during the last week of April, but in normal years they might be expected to appear during the first week of May. On the 3rd of that month one or two nymph-skins of *Pyrrhosoma nymphula* were certainly found on Esher Common in Surrey, but no imagines were seen. At the same place, on May 7th, three that had but lately emerged were observed, one being on the wing. A single specimen of *Enallagma cyathigerum* was also found there on the 7th, which had so recently emerged that the abdomen had not attained its full length. This latter species was on the wing to some extent on Esher Common by May 13th. At the same place, on May 14th, a *Cordulia ænea* was captured in the teneral condition, and on May 21st four specimens of *Libellula quadrimaculata* were taken in the same immature state. On the 23rd *Ischnura elegans, Erythromma naias, Pyrrhosoma nymphula, Agrion puella, A. pulchellum,* and *Calopteryx splendens* were obtained at the Byfleet Canal, but most of them were in the teneral state. Indeed, though several species had been met with the season cannot be said to have well commenced previous to the summer weather that set in with the last few days of May.

After that a normal state of affairs was soon attained, and so favourable was the weather that by July some of the summer species were perhaps a little before their time. *Lestes sponsa* and *Sympetrum striolatum* were appearing on Ockham Common by July 8th, and *S. scoticum* and *Æschna grandis* by the 15th; while Mr. Arkle found *Leucorrhinia dubia* over on July 21st at the Delamere Forest localities in Cheshire, which he knows so well.

The fine autumn weather extended the season considerably at its latter end. On Esher Common *E. cyathigerum* was last seen on Sept. 17th, *Æschna mixta* on Sept. 24th, *S. scoticum* on Oct. 15th, and *S. striolatum* on Nov. 12th; while Mr. W. H. Harwood saw *Æ. mixta* disporting over the river Colne, in Essex, a few days before Oct. 21st. *Æschna cyanea* visited Mr. Briggs's garden at Lynmouth on Oct. 21st, and Mr. F. N. Clarke sent me a female, which was taken alive from a branch of ivy at Tetbury, in Gloucestershire, on Nov. 12th.

One of the most interesting events of the season was the visit of Messrs. King and C. A. Briggs to Strathglass, in Inverness-shire, in search of *Somatochlora metallica.* On the death of Dr. Buchanan White, Mr. King was the sole entomologist who had taken the insect in that its only known British habitat—a distinction which is now shared with him by the ardent neuropterist, Mr. C. A. Briggs. *S. metallica* was met with for two months from June 15th in Strathglass and Glen Affrick. The majority seen were males, which were "not uncommon, but patience and devotion in the highest degree" were needed for their capture, and, laconically adds Mr. Briggs, "they got it." *Somatochlora arctica* was taken in Strathglass in June, and in Glen Affrick early in August, in the latter locality at an altitude of 1400 ft.; but it was not common. *Æschna cærulea* was observed in widely separated districts in Strathglass and Glen Affrick, at altitudes varying from 400 ft. to 1200 ft., the last taken being a male on Aug. 12th. It was rare and difficult to catch. Strathglass and Glen Affrick constitute a new British locality for the last species, making the third, all of which are in Scotland.

Other species of *Odonata* observed by Mr. Briggs in Strathglass in July were *E. cyathigerum* and *P. nymphula*, which were fairly common; *L. dubia*, scarce; *L. sponsa*, common, but immature, at one little pond at Invercannick; and *Cordulegaster annulatus*, which was not uncommon, and an easy capture.

Unfortunately neither Mr. King nor Mr. Briggs succeeded in obtaining nymphs of *S. metallica*, *S. arctica*, or *Æ. cærulea*, though the latter obtained eggs of *S. metallica*, which he removed from outside the vulvar scale of a worn female captured while apparently ovipositing. Each egg was about half a millimetre long, and from a quarter to a third of a millimetre wide. The colour was pale yellow, and shape elliptical. It possessed a rather long, slender, transparent pedicel at one end, which appeared to belong to a thin transparent outer envelope of the egg. The contents had a granular appearance.

Another interesting expedition was one undertaken by Mr. H. S. Fremlin to Stornoway, in the Outer Hebrides—a still more distant hunting-ground. Though more especially interested in

Lepidoptera, Mr. Fremlin brought home a few dragonflies, as samples of what the district was capable of producing in that direction. They were: *I. elegans*, *P. nymphula*, *E. cyathigerum*, *Æschna juncea*, *L. quadrimaculata*, and *S. striolatum*. The first five call for no special notice, except that *L. quadrimaculata* was small and of the clearly marked but little suffused Scotch form; but the two specimens (both females) of *S. striolatum* crave somewhat closer attention. In size each is but little larger than a well-grown *S. scoticum*, and in general appearance, especially in the colouring of the sides of the thorax, closely resembles that insect. In the typical *S. striolatum* the sides of the thorax have two well-defined broad yellow oblique bands, separated by a duller somewhat interrupted third one. In the Stornoway specimen the middle band is reduced to a few spots (Plate IV., A) much as in *S. scoticum*. The amount of black colouring on the sides of the abdomen also point a little in the direction of *S. scoticum*, though the arrangement of those markings on the whole recall *S. striolatum*. The vulvar scale appears to be of a form intermediate between those of the two species, for, though not pointed as in *S. scoticum*, it does not appear to be at all notched as in *S. striolatum*. On the other hand, the pterostigma (Plate IV., *a*) is decidedly that of *S. striolatum*, and the yellow mark on the metasternum (Plate IV., *a a*), though rather sharply defined, resembles that of *S. striolatum* rather than of *S. scoticum*. Further, which is perhaps more important than all, the legs are clearly lined with yellow above, as in the division of the genus *Sympetrum*, to which *striolatum* belongs, whereas in the *scoticum* division they are black. The conclusion to which we must come, seeing that there are two specimens, thus precluding an aberration, appears to be that the insects belong to a form of *S. striolatum* somewhat resembling *S. scoticum* (possibly a local race), or else that both insects are hybrids between the two species; Mr. McLachlan, who has examined the insects, inclines to the latter opinion. Should any entomologist visit Stornoway during the coming season he may perhaps be able to throw some light upon the subject.

Sympetrum flaveolum was again present in good numbers on Ockham Common in August. The locality was visited during the month by Mr. H. J. Turner once, and by myself twice, but only males were taken; and we must conclude that the presence of the species was due to another migration. Rev. J. E. Tarbat took a male near Wokingham about July 6th, and I probably saw one near Christchurch. It should be stated that Mr. W. H. Harwood took a female at St. Osyth, in Essex, on a part of the coast where it would be hardly likely to breed. With *S. flaveolum*, on Ockham Common, several specimens of *Sympetrum sanguineum* were taken, one being a female. Mr. Turner also took a female at Cliffe Marshes, near Gravesend, and Mr. Harwood states that the species breeds on a part of the Essex coast. Numbers of *S. scoticum* were met with by Mr. Briggs and myself at a large pond on Exmoor, where their large size was noticeable. The species is also reported from Chobham Common and Chertsey, in Surrey (E. Vincent). On Sept. 13th I for the first time noticed a dragonfly, which appeared to be *S. striolatum*, flying backwards; moreover, it was not so acting in order to back out of a corner, for no obstacle was near it.

On Aug. 15th Mr. A. H. Hamm took a male *Sympetrum vulgatum* at Torquay. It did not appear to be a solitary specimen, but Mr. Hamm unfortunately brought away but one, not recognising at the time the importance of his capture. This is the second authenticated British specimen.

Again *Orthetrum cærulescens* was extremely common in the New Forest in August; it appeared to be just coming on the wing at the beginning of June. There has been a welcome increase in the number of known localities of its congener, *O. cancellatum*—a pair were taken in Sussex, near Liphook (H. J. Turner), and the species has been discovered on Chobham Common, Surrey (E. Vincent). Dr. F. A. Walker also describes an insect taken by him near Byfleet which is in all probability a female of this species.

Mr. C. A. Briggs reports *Cordulegaster annulatus* as present, but not common, and difficult to catch, along the East Lynn River in North Devon.

On July 29th a female *Anax imperator*, dull bluish in colour, was observed hawking, between seven and eight in the evening, very slowly over a stream in the New Forest, reduced by the drought to a string of pools. When the insect was held by the legs, after being knocked down by a stick, it vibrated its wings very rapidly, especially at the tip, the base not appearing to move at all. On the ear being brought near a deep hum was heard. When the finger touched the abdomen the vibration could be felt there. Mr. E. B. Bishop observed an insect on Crooksbury Common, Surrey, on June 28th, which by description must be a female of this species, so furnishing yet another Surrey locality for this handsome dragonfly. Mr. H. J. Turner captured a female in Sussex, near Liphook. Its near relative, *Brachytron pratense*, was taken (J. Prest) at the Broads near Lowestoft in the beginning of June.

Males of *Æschna mixta* were rather plentiful on Esher Common in September. They often flew low down amongst the tall reeds, whereas they usually fly quite high round the trees and tall bushes. Though no captures were made in either place, I almost certainly met with the species at Ockham Common and in the New Forest. In the neighbourhood of Colchester, Mr. Harwood found the species from August till October, and more generally distributed, though perhaps on the whole scarcer than last year. Mr. C. W. Colthrup found one dead at Folkestone on Oct. 3rd. In addition to the discovery of *Æ. juncea* at Stornoway, in Lewis, by Mr. H. S. Fremlin, Mr. Briggs and myself found it rather common on Aug. 21st at a large pond on Exmoor, in Somerset.

Calopteryx splendens and *C. virgo* have been reported from Moor Park, near Farnham (E. B. Bishop); *C. virgo* from Puttenham Common, Surrey (E. B. Bishop), and North Devon (C. A. Briggs); *Lestes sponsa*, Chobham Common (E. Vincent); *E. naias*, Virginia Water and Chobham Common, Surrey (E. Vincent); *Ischnura elegans*, Exmoor (W. J. L.); *Agrion pulchellum*, Broads near Lowestoft (J. Prest); and *E. cyathigerum*, Keswick (E. B. Bishop), and Exmoor (W. J. L.).

Pyrrhosoma tenellum was captured in June in a new locality—in Sussex, near Liphook—and it occurred as usual in numerous localities in the New Forest, where also *Agrion mercuriale* was found in good numbers. In Richmond Park an aberration of *I. elegans* was taken with two small distal blue spots on the dorsal surface of the seventh segment of the abdomen.

Some nymphs of *C. splendens*,* dredged from the Byfleet Canal on March 12th, were so very small that they could not possibly have been ready to emerge at their proper time that season; and the same must be said of a tiny nymph of *Gomphus vulgatissimus*, taken from a stream in the New Forest on June 4th. We must therefore assume that these two species are, or may be, more than one year in reaching maturity. Empty nymph-cases of the latter dragonfly found in the New Forest were coated with mud, and in all cases were on the grassy bank of the stream, not on rushes. Possibly their legs, which are well adapted for burrowing, are not suitable for climbing.

On April 17th an emergence of a female *P. nymphula*, which commenced about 9.40 a.m., was watched. The "rest" before the extremity of the abdomen was withdrawn lasted about twenty minutes; the head was *not* thrown backwards. The wings were of full size about an hour before the body was. Another female that emerged on April 22nd rested in the same manner as did the former.

On May 11th two males of *E. cyathigerum* emerged from the nymph-case, and the identity of the nymph was by this means established.

About 7.35 a.m. on May 14th a *Cordulia ænea* was noticed partly out of its nymph-case, and then in its "resting position," with head and thorax thrown backwards. At 8 o'clock it bent itself upwards, and drew out the rest of its abdomen, showing that it was a female. An hour later its wings were of full size, and dull grey in colour. The lengthening of the body took place almost entirely after the wings were full-grown. About 1.30 p.m. the insect had flown from its support, the abdomen was bronze-coloured, and the wings were transparent, though suffused with a yellowish tint.

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* This and the other nymphs referred to are fully described in my 'British Dragonflies,' and in some cases figured.

By collecting nymph-skins while the species was emerging the identity of the nymph of *S. striolatum* was satisfactorily determined. It may be recognised by the long lateral spines on the hinder segments of the abdomen. Some of the skins were very dark in colour. *S. scoticum*, which somewhat resembles it, is smaller, and has very short lateral spines.

Nymph-cases of *Lestes sponsa* were found on Ockham Common on July 8th. This nymph is an extremely interesting one from the fact that it holds an intermediate position between the Calopteryginæ and the rest of the Agrionidæ. Its ladle-shaped mask bears considerable resemblance to that of *Calopteryx*, while its banded lamellæ (Plate IV., B) are rather thick, and are easily separated into two layers. The outer lamellæ are longer and straighter than the middle one, which is figured. The margin (Plate IV., *b*) is ornamented with stout spines two-thousandths of an inch long, separated in some parts by two or more slender ones.

Platycnemis pennipes was bred on July 10th from a nymph obtained in the New Forest. In colour it was yellowish brown. The mask was of the usual *Agrion*-type, but the lamellæ (Plate IV., C) are again sufficiently distinct to serve as a means of identifying the species. They are long, and terminate in a very attenuated point. The margin (Plate IV., *c*) is clothed with hairs, many of which towards the distal extremity are very long, about one-fiftieth of an inch. The lamellæ are slightly mottled with brown, and the middle one is a little broader than the outer ones.

Amongst the nymphs of *P. pennipes* was one of *A. mercuriale*, which, however, was not recognised till it emerged, when there was little in the body of the nymph-case to distinguish it from other Agrions The two lamellæ which it possessed were extremely small, and, if they did not represent two renewed ones partly grown, would easily serve to distinguish the species.

I must not conclude without referring to some interesting observations that Rev. F. East has been making on the nymphs of *Æschna cyanea*. He found that out of sixty-one emergences, thirty-one were females and thirty males. Though some emerged in the daytime, the majority came out at night—by night I conclude we are to understand the very early morning. The nymphs were taken from a pond in his garden, and as the perfect insects emerged most—fifty-six—were set free. None remained at the time near the pond, but later in the summer some returned and hawked round the pond and the garden as usual.

As a result of experiments made by Mr. East with *Æ. cyanea* and one of the Agrioninæ, it seems that dragonflies, so long as they are kept in damp air, are able to live for many days out of water. They appear to remain in good health, and, when put into water for a time, seem perfectly happy, and feed as if nothing had happened. It will be interesting to see if this change in their manner of life has any effect on their final development.

Explanation of Plate IV.—A. *Sympetrum striolatum* var. (× 3); *a*, pterostigma (× 6); *aa*, metasternum and first and second segments of abdomen (× 6). B. *Platycnemis pennipes*, middle caudal lamella (× 7); *b*, portion of margin (highly magnified). C. *Lestes sponsa*, middle caudal lamella (× 10); *c*, portion of margin (highly magnified).

LEPIDOPTERA OCCURRING IN COUNTY CORK.

By R. J. F. Donovan.

As I have seen so few records of Irish Lepidoptera in the 'Entomologist,' I thought the following list, enumerating captures since the autumn of 1896, might be of interest. Except where otherwise stated, all the species referred to were taken in or about the Ummera Woods. These woods, which are not very extensive, consist mostly of larch, Scotch fir, and oak, intermixed with elm, birch, ash, and beech, and lie within two miles of the village of Timoleague. All doubtful captures, comprising nearly all the Eupitheciæ and Acidaliæ, were very kindly named for me by Mr. Kane. As will be seen on consulting Mr. Kane's 'Catalogue of Irish Lepidoptera,' my best captures were *Leucania extranea* (second record for Ireland), *Sterrha sacraria* (also second record for Ireland), and *Laphygma exigua* (first record for Ireland), with *Hadena dissimilis*, *Eupithecia virguareata*, *E. valerianata*, &c.

Pieris brassicæ, *P. rapæ*, *P. napi*, and *Euchloë cardamines*. All more or less common.

Colias edusa. One or two seen each year. Plentiful in 1899.

Argynnis aglaia. A few specimens seen each year. — *A. paphia*. Plentiful about the woods.

Melitæa aurinia. A colony near Inchy Bridge.

Vanessa urticæ. Common.—*V. io* and *V. atalanta*. Not so common as *V. urticæ*.—*V. cardui*. A few in 1897; plentiful in 1899.

Pararge egeria. Common.—*P. megæra*. Somewhat scarcer.

Satyrus semele. Not uncommon along the railway.

Epinephele ianira, *E. hyperanthus*, and *E. tithonus*. Common.

Cænonympha pamphilus. Fairly common.

Thecla quercus. Not common.—*T. rubi*. One specimen on May 19th, 1898.

Polyommatus phlœas. Common.

Lycæna icarus. Common.—*L. minima*. Two specimens near Coolmaine Castle, Harbour View, June 26th, 1897.

Acherontia atropos. One larva, in 1896, dried up in pupal state. One dead imago from Butterstown on Sept. 20th, 1899.

Chærocampa porcellus Two specimens at Harbour View in 1897.—*C. elpenor.* Two specimens in 1898; one in 1899. Larvæ were obtained in both years, but they were unfortunately ichneumoned.

Smerinthus ocellatus. A few larvæ. One imago in 1898.—*S. populi.* Larvæ rather common.

Macroglossa stellatarum. A few most years, common in 1899.—*M. bombyliformis.* Scarce; rather plentiful in one field in 1897.

Ino statices. Not common.

Zygæna filipendulæ. Common.

Halias prasinana. Pupæ common under moss on oak trees.

Nudaria mundana. Common.

Gnophria quadra. Seven specimens altogether at light.—*G. rubricollis.* Pupæ common, but almost all ichneumoned; imagines not uncommon on road passing through woods.

Euchelia jacobææ. Common.

Arctia caia. Larvæ fairly common.

Spilosoma fuliginosa. One specimen on June 24th, 1899.—*S. mendica.* Five specimens, all referable to var. *rustica.*—*S. lubricipeda* and *S. menthastri.* Common.

Hepialus humuli and *H. lupulinus.* Common.—*H. velleda.* Four specimens.

Dasychira pudibunda. Common.

Orgyia antiqua. Larvæ not uncommon; imagines very plentiful in 1899.

Pœcilocampa populi. Two specimens in 1897, one in 1899; a few pupæ on tree trunks.

Bombyx rubi. Common.—*B. quercus.* Larvæ common.

Dicranura vinula. Larvæ common.

Notodonta camelina. Larvæ rather common.—*N. ziczac.* Two larvæ in 1899.

Phalera bucephala. Larvæ common.

Thyatira derasa. Common.—*T. batis.* Not so common.

Demas coryli. Three specimens.

Acronycta psi. Five pupæ in rotten branches of alder.—*A. leporina.* One specimen on June 20th, 1898.—*A. rumicis.* Common.

Leucania conigera. Not uncommon.—*L. lithargyria.* Commoner than the preceding.—*L. extranea.* One specimen (see Entom. xxx. p. 80).—*L. comma, L. impura, L. pallens.* More or less common.

Tapinostola fulva. One specimen on Sept. 29th, 1897. Larvæ of perhaps this species at roots of bog-cotton—discovered by pulling the reeds separately, and those that come up easily mostly contain a larva at the root.

Nonagria arundinis. Plentiful at Grange Bog, about one and a half mile from Timoleague.

Hydræcia nictitans and *H. micacea.* Common.

Axylia putris. Scarce.

Xylophasia rurea. Rather scarce.—*X. lithoxylea* and *X. monoglypha.* Common.

Laphygma exigua. One specimen on Sept. 8th, 1899.

Neuronia popularis. Common.

Charæas graminis. Fairly common.

Luperina testacea. Rather common.—*L. cespitis.* Ten specimens.

Mamestra furva. Scarce, more plentiful than usual in 1899.—*M. brassicæ.* Common.—*M. persicariæ.* Two larvæ low down on birch trees. Two pupæ.

Apamea basilinea. Four specimens.—*A. gemina.* A few in 1899.—*A. didyma.* Common.

Miana strigilis. Common.—*M. literosa* and *M. bicoloria.* Not uncommon, the latter very variable.

Grammesia trigrammica. Common.

Stilbia anomala. About five specimens altogether.

Caradrina taraxaci. Not very common.—*C. quadripunctata.* Common.

Rusina tenebrosa. Fairly common.

Agrotis suffusa. Common.—*A. saucia.* Scarce; plentiful in 1899.—*A. segetum* and *A. exclamationis.* Common.—*A. corticea.* One or two each year.—*A. strigula.* Four specimens.

Noctua glareosa. Four specimens.—*N. plecta.* Common.—*N. c-nigrum.* Not uncommon.—*N. triangulum.* Four specimens.—*N. brunnea?* One specimen.—*N. rubi.* Fairly common.—*N. umbrosa.* Four specimens.—*N. baia.* One specimen.—*N. xanthographa.* Common.

Triphæna ianthina. Fairly common.—*T. fimbria.* Larvæ common in spring.—*T. interjecta.* Three specimens.—*T. comes* and *T. pronuba.* Common.

Amphipyra pyramidea? A dried-up pupa at root of an elm.—*A. tragopogonis.* Common.

Mania typica. One specimen on Aug. 11th, 1897.

Panolis piniperda. Three specimens.

Pachnobia rubricosa. Not uncommon.

Tæniocampa gothica, *T. incerta*, *T. stabilis*, and *T. pulverulenta.* Common.—*T. gracilis.* Scarce.

Orthosia lota. Two specimens.—*O. macilenta.* Several specimens in 1898; one larva in 1899.

Anchocelis pistacina. Common.—*A. lunosa.* Rather scarce.

Cerastis vaccinii. Common at sallow.

Scopelosoma satellitia. At sallow.

Xanthia flavago. A few specimens.—*X. circellaris.* Common.

Calymnia trapezina. Rather plentiful.

Dianthœcia capsincola. Common.—*D. cucubali.* A few specimens.—*D. capsophila.* Common.

Hecatera serena. Scarce.

Miselia oxyacanthæ. Not common.

Agriopis aprilina. One specimen on Nov. 1st, 1897.

Euplexia lucipara. A few specimens.

Phlogophora meticulosa. Common.

Aplecta prasina. About four specimens.—*A. nebulosa.* Common.

Hadena dentina and *H. oleracea.* Common.—*H. dissimilis.* About six specimens.—*H. pisi.* Two specimens in 1899.—*H. thalassina.* Four or five specimens.

Xylocampa areola. Common.

Calocampa vetusta. Fairly common.—*C. exoleta.* Three specimens.

Xylina ornithopus. Scarce at sallow.—*X. socia.* Fairly common at sallow and ivy.

Cucullia umbratica. Common.

Gonoptera libatrix. Larvæ common.

Habrostola tripartita. One specimen on June 7th, 1899.—*H. triplasia.* Common.

Plusia chrysitis. Rather common.—*P. bractea.* One specimen on July 17th, 1898.—*P. festucæ.* Two specimens, one on October 8th, 1897, and the other on July 11th, 1898.—*P. pulchrina.* Not uncommon.—*P. gamma.* Common.

Chariclea umbra. A few specimens.

Phytometra viridaria. Common.

Euclidia mi. Common.

Zanclognatha grisealis. Not uncommon.—*Z. tarsipennalis.* One specimen on July 5th, 1898.

Hypena proboscidalis. Common.

Uropteryx sambucaria. Common.

Epione apiciaria. Four specimens.

Rumia luteolata. Common.

Venilia macularia. Not uncommon.

Metrocampa margaritaria. Fairly common.

Ellopia prosapiaria. Three specimens.

Eurymene dolobraria. Seven specimens.

Selenia bilunaria. Common, with a few examples of var. *juliaria.*

Odontopera bidentata. Pupæ and imagines common.

Crocallis elinguaria. Rather scarce.

Eugonia alniaria. One specimen on Aug. 22nd, 1898.—*E. quercinaria.* Common.

Himera pennaria. Rather common.

Phigalia pedaria. A few pupæ. One imago on March 7th, 1898.

Amphidasys strataria. Three specimens in 1899.—*A. betularia.* Larvæ and pupæ fairly common.

Cleora lichenaria. Rather common.

Boarmia repandata. Common.—*B. cinctaria.* One specimen in moth-trap on April 21st, 1898.

Gnophos obscuraria. A few specimens.

Pseudoterpna pruinata. Common.

Geometra papilionaria. Two larvæ on birch; one imago on July 9th, 1898.

Iodis lactearia. Common.

Acidalia dimidiata, *A. subsericeata*, and *A. aversata.* Common.—*A. trigeminata.* Not uncommon; named by Mr. Kane, which is perhaps a slip, as he does not include this species in his 'Catalogue.'—*A. marginepunctata* and *A. imitaria.* Not uncommon.

Cabera pusaria. Common.—*C. exanthemaria.* Not uncommon.

Macaria liturata. One specimen at light on July 11th, 1898. A pupa in 1899.

Panagra petraria. One specimen on May 29th, 1899.

Selidosoma ericetaria. One specimen on Aug. 5th, 1897.

Ematurga atomaria. Four specimens.

Sterrha sacraria. One specimen on Aug. 27th, 1898.

Abraxas grossulariata. Common.

Lomaspilis marginata. Common.

Hybernia marginaria. A few at sallow.—*H. defoliaria.* Three specimens and one pupa in 1899.

Anisopteryx æscularia. Two specimens in 1899; one in 1900.

Cheimatobia brumata. Common.

Oporabia dilutata. Common.

Larentia didymata. Three specimens in 1897.—*L. multistrigaria.* Not uncommon at sallow.—*L. viridaria.* Fairly common.

Emmelesia alchemillata? One specimen on Aug. 10th, 1898.—*E. albulata.* Plentiful in one spot.—*E. unifasciata.* Four specimens.

Eupithecia venosata. Not uncommon.—*E. pulchellata.* Four specimens in 1898; not uncommon in 1899.—*E. oblongata.* A few examples. Plentiful at Coolim Cliffs, about three miles beyond Courtmacsherry.—*E. subfulvata.* Five specimens; also two specimens of var. *oxydata.*—*E. plumbeolata.* Six specimens.—*E. satyrata.* Four specimens. Larvæ rather plentiful on flowers of *Scabiosa succisa.*—*E. scabiosata.* Rather plentiful over a heath in 1899.—*E. castigata.* A few of a peculiar variety resembling *E. pusillata.*—*E. virgaureata.* Larvæ and imagines plentiful.—*E. valerianata.* One imago. Larvæ on almost every flower-head of *Valeriana officinalis.*—*E. nanata.* Three specimens. Larvæ common on *Calluna vulgaris.*—*E. vulgata.* Rather common.—*E. absinthiata.* Common.—*E. assimilata.* Two specimens. A few larvæ.—*E. lariciata.* Three specimens.—*E. abbreviata.* Not uncommon.—*E. pumilata.* Common.—*E. coronata.* Three examples of the first and one of the second brood.—*E. rectangulata.* One specimen in 1898. Larvæ common in 1899.—*E. debiliata.* Larvæ plentiful in one part of the woods. Two specimens of a peculiar unicolorous variety.

Lobophora viretata. A few in 1899.

Thera variata. Summer brood common in 1899; three examples of the autumn brood in 1898.

Hypsipetes trifasciata. Sixteen pupæ in rotten stumps and branches of alder.—*H. sordidata.* Rather common.

Melanthia ocellata and *M. albicillata.* Not common.

Melanippe sociata, *M. montanata*, and *M. fluctuata.* Common.

Coremia unidentaria. Common.

Camptogramma bilineata. Common.—*C. fluviata.* A few specimens.

Phibalapteryx vittata. Plentiful over a marsh in 1898.

Eucosmia undulata. One imago. Larvæ not uncommon on small willow bushes.

Cidaria siderata. Common.—*C. miata.* A few specimens.—*C. truncata.* Common.—*C. suffumata.* A few specimens.—*C. prunata.* Two specimens.—*C. testata* and *C. populata.* A few of each.

Pelurgia comitata. A few specimens.

Eubolia limitata and *E. plumbaria.* Common.

Anaitis plagiata. Common.

Platyptilia ochrodactyla. One specimen.

Mimæseoptilus bipunctidactyla. Common.—*M. pterodactylus.* One specimen.

Pterophorus monodactylus. Common.

Aciptilia pentadactyla. Fairly common.

Alucita hexadactyla. Common.

Ummera House, Timoleague.

A GUIDE TO THE STUDY OF BRITISH WATERBUGS (AQUATIC RHYNCHOTA).

By G. W. Kirkaldy, F.E.S.

(Continued from vol. xxxii. p. 300.)

The true "waterbugs"—*i.e.* those which pass the greater portion of their existence actually beneath the surface of water—whether it be running stream, stagnant pond, or brine pool—and which are considerably modified in their structure in accordance with their environment—have been usually placed in a single division by modern authors, partly for convenience, and partly from a mistaken idea of the taxonomic importance of one or two characters, *e.g.* the great alteration in the magnitude and situation of the antennæ, which in the majority of the forms are concealed when at rest in grooves on the under side of the head, whence the group is usually termed Cryptocerata (or Kryptokerata).* This modification is, however, evidently not a test of relationship, but connected with the nature of their habitat. In the same way that coleopterists perceived at length that the Dytiscidæ, Gyrinidæ, Hydrophilidæ, &c., were really not closely allied, despite their common habitat and their superficial resemblance, so have many rhynchotists now realised that there are two heterophyletic divisions—probably very distantly related—of aquatic bugs.

The first of these—the Naucoroidea—embraces the British families Naucoridæ, Corixidæ, and Notonectidæ, and the exotic Mononychidæ (which should perhaps be included in the Naucoridæ) and Belostomatidæ. The second—the Nepoidea—contains a single family, the Nepidæ, with two British genera, viz. *Nepa*, Linn., and *Ranatra*, Fabr. The Gerridæ, which have previously been discussed, are related more nearly to the Nepoidea than to the Naucoroidea, but have in any case arisen quite separately, probably from a proto-Reduvioid stock, from which indeed the Nepoidea also probably originated.

The first step towards an aquatic life to which *Notonecta* has become so admirably adapted would be represented by a bug not unlike *Acanthia*, Fabr. Latr. [*Salda*, Saund.], a genus of which we have eighteen species in our islands. These are most diverse in their habits, most of them frequenting the margins of streams, ponds, salt marshes, often under stones: one species is to be found in *Sphagnum;* while another occurs far away from moisture on sandy commons or moors, under heather or in sandpits. Two species at least move about from plant to plant under water,[*] although no special modifications have apparently arisen in the structure of these bugs in relation to an incipient aquatic life. The next link is indicated by a curious and somewhat isolated family, the Ochteridæ,[†] which is distinguished from *Acanthia* at first sight by the greater continuity of curve from head to abdomen in the lateral margins. The rostrum is very similar to that of *Acanthia*, and the legs are simple, but the antennæ are very short, being concealed under the head. Nevertheless they are not strictly aquatic, but frequent the banks of rivers, feeding upon small insects, after the manner of some of the species of *Acanthia*. The nymph lives beneath moist sand. There are unfortunately no British species of the family, but *Ochterus* (=*Pelogonus*) *marginatus*, Latr., is found so near as France, Spain, and Italy.[‡]

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* Greek κρυπτός (*kruptos*), hidden ; κέρας (*keras*), a horn.

With the Naucoridæ we enter upon the true aquatic forms. Comparatively little adaptation to an aquatic life has been effected even here, but in the higher forms the posterior legs are more natatorial, and the antennæ more greatly modified. The exotic Belostomatidæ are superficially much like the Naucoridæ, but may be at once separated by the peculiarly shaped antennæ and more natatorial posterior legs. The Corixidæ have undoubtedly originated from a Naucoroid ancestor, and are all strictly aquatic. The Notonectidæ are also Naucoroid, and are perhaps the most specialised of all aquatic insects; they certainly ought not—as in the arrangements of most authors—to be interpolated between the Naucoridæ and Corixidæ, but should be placed immediately after the latter.

The Nepidæ are—apart from some profound structural differences—readily distinguished by the fact that they respire by means of long filamentary tubes at the anal end of the body,[§] and, while the Naucoroidea move the opposite legs together, the Nepoidea move them alternately. The following table will separate the three families into which the Naucoroidea are divided:—

1.	Somewhat flat and rounded; anterior legs inserted on the anterior margin of the prosternum (fig. 29)	1. Naucoridæ.
1a.	Oval or elongate oval; anterior legs inserted on the posterior margin of the prosternum (fig. 30)	2.

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[*] J. E. Mason, E. M. M. xxv. p. 236.

[†] Pelogonidæ, auctt.

[‡] The extra-British Mononychidæ (*Mononyx*, Spin., *Gelastocoris*, Kirk., &c.) need not be considered here, as, although they are intermediate between the true landbugs and true waterbugs—being riparian and kryptokeratous—they do not indicate any of the intermediate stages of evolution.

[§] The strap-like processes in the Belostomatidæ are sexual.

2. Somewhat flat, but elongate; rostrum short, apparently not jointed; anterior tarsi more or less spoon- or knife-shaped . . . 2. Corixidæ.

2a. Very convex; rostrum long, with three to four segments; anterior tarsi simple, raptorial . 3. Notonectidæ.

NAUCORIDÆ.

Of this family, the British species of which are characterised by the somewhat flat broad oval form, we have perhaps three genera, viz. *Aphelocheirus*, Westwood, *Ilyocoris*, Stål, and *Naucoris*, Geoffroy; but the presence of the third is doubtful.

The following table will separate the three genera:—

1. Rostrum long, reaching base of mesosternum; head above produced in front of the eyes, and sensibly narrowed, subhorizontal; antennæ reaching a little beyond the sides of the head. Tarsi 2-segmentate, with two long curved claws each; posterior legs scarcely natatorial. [Always practically apterous.] Figs. 31–34 . . . . . 1. *Aphelocheirus*, Westw.

1a. Rostrum short, not reaching beyond base of prosternum; head not produced in front of eyes, but deflected shortly downwards; antennæ thickened, not reaching beyond sides of head. Anterior tarsi unsegmented, destitute of claws; intermediate and posterior tarsi 2-segmentate, with claws; posterior legs natatorial. [Macropterous or brachypterous] . . . . 2.

2. Anterior femora very greatly incrassate (beneath with a small pad of hair near the base), suddenly ampliated in a right angle at the base beneath, then narrowed. Figs. 35–39 3. *Naucoris*, Geoffr.

2a. Anterior femora greatly incrassate (beneath with broad pad of hair the whole length), not suddenly ampliated beneath in a right angle. Figs. 40–45 . . . . 2. *Ilyocoris*, Stål.

APHELOCHEIRUS* is, in many respects, a link between the Acanthiidæ and the Naucorinæ, and was indeed placed in the former by its founder. Although the subhorizontal face and long rostrum separate it from the other genera, it clearly belongs to the family. The head above is elongate and horizontal (or nearly so); the rostrum long, slender, narrowing towards the apex (fig. 31); the antennæ consist of four segments, and are apparently destitute of sensory organs, the antennal groove is slight (figs. 32 and 33). The pronotum is deeply excavate anteriorly, greatly expanded laterally, prosternum carinate,

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* ἀφελὴς (*aphĕlēs*), slender or simple; χείρ (*kheir*), a hand.

mesosternum elevated; femora all incrassate; tarsi 2-segmentate, not pilose, second segment longer than the first, terminated by two long stout curved claws (fig. 34). The connexivum, which is not very clearly marked off, is spinosely produced posteriorly.

Until recently only a single species of the genus—known as *A. æstivalis* (Fabr.)—was included in the British lists. Dr. Horváth, in his recent monograph of the genus,* has added another, which he names *A. montandoni*. These two species seem to be sufficiently distinct, but I think the learned Doctor has fallen into error in maintaining *A. æstivalis* as British. It is true that the figures given by Westwood and by Douglas and Scott refer to the latter species, but they were both drawn from one of the original specimens of Fabricius† captured in France; and I am not aware of macropterous examples having been obtained in the British Isles. All the apterous individuals I have seen—including those in my own collection—belong to *A. montandoni*, and we must therefore apparently erase *æstivalis* from our lists.

The synonymy of the two species should be amended to:—

1. *Aphelocheirus æstivalis* (Fabr.).

Westwood (pp.), 1833, Ann. Nat. Hist. vi. p. 228; 1839, Modern Class. Ins. i. frontispiece, fig. 7, and 1840, ii. p. 466, fig. 120; Douglas and Scott, 1865, Brit. Hem. pl. 19, f. 5.

Habitat. France, Germany, and Hungary (not England).

2. *A. montandoni*, Horv.

= *A. æstivalis*, Dougl. and Scott, *l.c.* p. 578. Saunders, 1876, Trans. Ent. Soc. Lond. p. 643, and 1892, Hem.-Heter. Brit. Isl. p. 326, pl. 30, fig. 9 (*nec* Fabr.).

Habitat. England, France, Germany, Switzerland, Russia, and Rumania.

A. montandoni is rather smaller, wider, and flatter than *æstivalis*, narrower anteriorly in proportion, and the head paler and longer. The terminal segments in both sexes are somewhat different in shape. Only the apterous form is known so far. It has been recorded in England from Bagley Wood, Oxford (years ago—Mr. Burr has not been able to find it recently); the Evenlode, near Eynsham, Oxford; Sutton Park, Warwickshire; Avon, near Bath; Costessey, near Norwich; and Worcester.

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* 1899, Termész. füzet., xxii. pp. 256–67.

† "My British specimens have but short rudimentary oval hemelytra, like those of the bed-bug; but I possess one of Bosc's original specimens, described by Fabricius, not quite so large as the others, in which the wings are fully developed."—Westwood, 1840, Mod. Classif. Ins. ii. p. 466. Douglas and Scott borrowed Westwood's French specimen to figure the macropterous form (which they did not possess) in the 'British Hemiptera.'

The genital segments of these two species are figured by Horváth in the work quoted above.

In my own collection I have, besides British examples, a good series from the Seine, near Rouen, collected by my kind friend M. Henri Gadeau de Kerville.

I have never had the good fortune to see this remarkable bug alive, but Westwood states that it "swims very fast, using its hind legs chiefly, but crawls very slowly, using its four fore feet." Gadeau de Kerville has captured it in great numbers in the Seine, and notes its extreme agility in the water. He has observed it feeding upon the larvæ of the coleopteron *Hæmonia*, and believes that it also preys upon the mollusks *Vivipara vivipara* [*Paludina*] and *Bythinia tentaculata*. The last named species deposits its transparent gelatinous ova upon the back of *Aphelocheirus*, and this habit led at first to the supposition that *Aphelocheirus* carries its ova in the same way as is known to occur in *Zaitha* and *Deinostoma*.*

J. L. Brown found it in great numbers years ago at Costessey † from June to September among a broad-leaved species of *Potamogeton* in a running stream.

The nymphs in the ultimate instar differ from the practically apterous adults by the non-spinosely produced connexiva, and by the unsegmented tarsi, the posterior pair being very long.

(To be continued.)

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 127.)

Micropteryx semipurpurella, *St.*—Wicklow Mts.; Clonbrock, Galway (*R. E. D.*).

M. unimaculella, *Zett.*—Wicklow Mts.

M. sparmannella, *Bosc.*—Enniskillen (*P.*).

M. subpurpurella, *Haw.*—Wicklow Mts.; Clonbrock, Galway (*R. E. D.*).

Nemophora swammerdammella, *L.*—Wicklow Mts.; Clonbrock, Galway (*R. E. D.*); Sligo (*R.*).

N. schwarziella, *Zell.*—Enniskillen (*P.*).; do.; L. Bray, Co. Wicklow; Belfast (*W.*).

(N. metaxella, *Hb.*—Belfast. Doubtful record.)

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* Gadeau de Kerville, 1887, 'Le Naturaliste,' pp. 199–201. See also Bull. Soc. Ent. France, 1884, pp. 83, 96, 112, and 128 (various communications by de Kerville and Bellevoye).

† See E. M. M. xi. pp. 16, 92, and 117.

ADELIDÆ.

ADELA RUFIMITRELLA, *Scop.*—Enniskillen (*P.*).

A. DEGEERELLA, *L.*—Killarney; Belfast (*W.*).

A. VIRIDELLA, *L.*—Sligo (*R.*).

A. CUPRELLA, *Thnb.*—Cromlyn, Westmeath (*Mrs. B.*).

HYPONOMEUTIDÆ.

SWAMMERDAMIA COMBINELLA, *Hb.*—Cork; Wicklow Mts.; Galway; Armagh (*J.*); Favour Royal, Tyrone (*K.*).

S. GRISEOCAPITELLA, *Sta.*—Armagh (*J.*); Derry (*C.*); Belfast (*W.*).

S. PYRELLA, *Vill.*—Howth; and about Dublin, common; Belfast (*W.*); Sligo (*R.*).

S. SPINIELLA, *Hb.*—Armagh (*J.*); Belfast (*W.*); Sligo (*R.*); Dublin coast, common.

HYPONOMEUTA PADELLA, *L.*—Belfast; Inishowen (*W. E. H.*); Enniskillen (*P.*); Connemara (*C. T. C.*).

H. COGNATELLA, *Hb.*—Dublin; Holywood, Co. Down; Blarney, Co. Cork; Armagh (*J.*); Sligo (*McC.*).

H. EVONYMELLA, *L.*—Belfast; Crom Castle, Fermanagh (*W.*); Carlow (*K.*); Clonony, Kings Co.; and Drumreaske, Monaghan (*K.*); and elsewhere throughout Ireland, occasionally very common.

PRAYS CURTISELLA, *Don.*—Belfast; Howth; Armagh (*J.*)

PLUTELLIDÆ.

PLUTELLA CRUCIFERARUM, *Zell.*—Belfast, abundant (*W.*); Sligo (*R.*); Derry (*C.*); and generally distributed.

P. PORRECTELLA, *L.*—Dublin, in gardens; Armagh (*J.*); Sligo (*R.*).

P. ANNULATELLA, *Curt.*—Howth, on the cliffs; much more brightly coloured than English specimens. Belfast, local; and Bundoran, Co. Donegal (*W.*); Sligo (*R.*); Letterfrack (*C. T. C.*).

P. DALELLA, *Sta.*—Western shore of L. Swilly, Co. Donegal (*G. V. H.*); Sligo (*R.*).

CEROSTOMA VITTELLA, *L.*—Rockabill Lighthouse, off Skerries, Co. Dublin (*K.*); Sligo (*R.*).

C. RADIATELLA, *Don.*—Wicklow Mts.; Mayo (*R.*); Sligo (*R.*); Markree, Co. Sligo (*K.*); Belfast (*W.*); Enniskillen (*P.*).

B. COSTELLA, *Fb.*—Killarney; Sligo (*R.*); Enniskillen (*P.*).

HARPIPTERYX NEMORELLA, *L.*—Sligo (*R.*).

H. XYLOSTELLA, *L.*—Sligo (*R.*); Inishowen (*K.*); Derry (*C.*); Belfast (*W.*); Howth (*G. V. H.*); Avoca, Co. Wicklow (*K.*).

GELECHIIDÆ.

ORTHOTELIA SPARGANELLA, *Thnb.*—Sligo (*R.*); Enniskillen (*P.*).

PHIBALOCERA QUERCANA, *Fb.* Generally common.

DEPRESSARIA COSTOSELLA, *Haw.* — Howth, abundant; Buncrana, Co. Donegal (*K.*); Belfast, abundant (*W.*); Sligo (*R.*); Letterfrack (*C. T. C.*).

D. FLAVELLA, *Hb.*—Sligo (*R.*); Howth and Kerry; Belfast (*W.*).

D. PALLORELLA, *Zell.*—Belfast (*W.*).

D. UMBELLANA *St.*—Howth; Killynon, Westmeath (*K.*); Belfast (*W.*); Letterfrack (*C. T. C.*).

D. ASSIMILELLA, *Tr.*—Howth.

D. SCOPARIELLA, *Zell.*—Letterfrack (*C. T. C.*).

D. ARENELLA, *Schiff.*—Armagh (*J.*); Belfast, abundant (*W.*); Sligo (*R.*); Clonbrock, Galway (*R. E. D.*).

D. PROPINQUELLA, *Tr.* — Sligo (*R.*); Clonbrock, Galway (*R. E. D.*).

D. SUBPROPINQUELLA, *Sta.*—Raheny, near Dublin; Letterfrack (*C. T. C.*).

D. RHODOCHRELLA, *H.-S.*—Howth; Letterfrack (*C. T. C.*).

D. ALSTRŒMERIANA, *Clerck.*—Dublin coast; Roches Point, Co. Cork; and Dunmore, Co. Waterford (*K.*); Sligo (*R.*); Letterfrack (*C. T. C.*).

D. PURPUREA, *Haw.*—Wicklow Mts., Clonmel.

D. CAPREOLELLA, *Zell.*—Armagh (*J.*).

D. CONTERMINELLA, *Zell.* — Enniskillen (*P.*); Sligo (*R.*); Derry (*N. H. C.*); Letterfrack (*C. T. C.*).

D. ANGELICELLA, *Hb.*—Enniskillen (*P.*).

D. OCELLANA, *Fb.* — Belfast; Clonbrock, Galway (*R. E. D.*); Sligo (*R.*); near Derry (*W. E. H.*); Enniskillen (*P.*); Mayo (*K.*).

D. YEATIANA, *Fb.*—Howth; Belfast (*W.*); Sligo (*R.*); Letterfrack (*C. T. C.*).

D. APPLANELLA, *Fb.*—Abundant everywhere.

D. CILIELLA, *Sta.*—Markree Castle (*K.*); Sligo (*R.*); Enniskillen (*P.*); Derry (*W. H. C.*); Letterfrack (*C. T. C.*).

D. ROTUNDELLA, *Dougl.*—Howth, at the foot of the cliffs.

D. DISCIPUNCTELLA, *H.-S.*—Minehead, Waterford (*K*).

D. DOUGLASELLA *Sta.*—Howth.

D. NERVOSELLA, *D. L.*—Cork (*McA.*); Derry (*W. H. C.*).

D. BADIELLA, *Hb.*—Dingle, Co. Kerry; Howth; Letterfrack (*C. T. C.*).

D. HERACLEANA, *De Geer*.—Common everywhere.

GELECHIA ERICETELLA, *Hb.*—Howth; Belfast, abundant (*W.*); Clonbrock, Galway (*R. E. D.*); Sligo (*R.*).

G. MULINELLA, *Zell.*—Howth, abundant; Sligo (*R.*); Letterfrack (*C. T. C.*).

G. SORORCULELLA, *Hb.*—Crookhaven, Co. Cork (*K.*).

G. DIFFINIS, *Haw.*—Howth, abundant.

BRACHMIA MOUFFETELLA, *Schiff.*—Killarney.

BRYOTROPHA TERRELLA, *Hb.*—Abundant everywhere.

B. DESERTELLA, *Dougl.*—Sandhills of Dublin coast; Derry (*C.*); Newcastle, Co. Down, abundant (*W.*); Sligo (*R.*).

(To be continued.)

NOTES AND OBSERVATIONS.

THE STEVENS COLLECTION.—The first portion of this very interesting collection of British Lepidoptera, gathered together during a period of over sixty years, was dispersed at the well-known auction rooms in King Street, Covent Garden, on March 27th and 28th last. The bulk of the material produced about usual prices per lot, but some of the choicer species and aberrations were keenly contested for by the bidders. The following are some of the more important items among the Rhopalocera:—

Pieris daplidice. Of this species there were four specimens, and the prices obtained for them ranged from 7s. to £1; the higher sum being paid for an example which the late Mr. Samuel Stevens himself captured at Dover in 1872.

Argynnis latona. Twelve specimens, six of which, taken by Mr. Stevens in 1872, sold at from 5s. 6d. to 17s. 6d.; the other examples averaged about 6s. each. One of the specimens was lotted with two examples of *A. niobe* taken by Parry in 1874, and the entire parcel only realized 16s.

There were nine specimens of *Vanessa antiopa*, all with data, and these sold at from 6s. to £1 5s.; the top price was given for an example taken at Worksop, Notts, in 1829; the lowest figure was for lots 41 and 42 combined — one ancient example dating from 1803, and formerly in Donovan's collection; the other taken at Hammersmith in 1849—12s. the couple.

Fourteen specimens of *Chrysophanus dispar* were offered, one example at a time, and these realized altogether £71 15s., which amount works out an average of £5 2s. 6d. apiece. The lowest price was £2 for a dwarf male, while a grand example of the same sex brought £8.

Lycæna acis was represented by seventeen specimens, and these fetched £6, or at the rate of about 7s. each; the first lot of six examples, however, went for £2 10s., which gives an average price per specimen of about 8s. 3d.

Lycæna arion, of which species there were eighteen examples, found purchasers at about 2s. 3d. each; but the first lot of four specimens, two of which were taken at Bude in 1895, sold for 14s.

Varieties.

A lot containing eighteen *Euchloë cardamines*, including a male specimen without central spot and black tips to fore wings, and one female example with the central spots much larger than usual, realized £2 7s. 6d.

An exceptionally fine rayed and suffused variety of *Argynnis paphia* was sold for £3; another aberrant example of this species, with large elongated submarginal spots, found a purchaser at £4 10s.; a female with large discal blotches, together with a colourless spotted male and three other examples, brought £2 10s.

A pair of dark specimens of *Argynnis aglaia:* the male, with rays on the margin of hind wings, was secured for an outlay of £2 10s.; whilst an example of var. *charlotta*, taken in the New Forest in 1870, by the Rev. J. Watson, went for five guineas.

A silvery variety of *Argynnis adippe*, from Dr. Harper's sale, was evidently a desideratum, and the price given for it was £6 16s. 6d.; another specimen of this species, with the fore wings, except spot in the cell, densely irrorated with black, brought £3 10s.; a third example, a female, with large confluent blotches on disc of the fore wings sold for £3 5s.; a fourth specimen, with the silver spots absent, realized £3.

An aberration of *Argynnis euphrosyne*, taken at Darenth, described as having "under side of fore wings with disc black and margin orange with yellow rays, hind wings with silver spots elongated, central one reaching margin," induced the bidding to mount up to the respectable sum of £6; an example with under surface of hind wings as in the specimen last referred to, and the upper surface of all the wings nearly black, brought £1 10s. less; a third variety, with almost black upper surface and dark under surface, silver spots normal, sold for £2 5s.

Lot 37, comprising thirteen specimens of *Melitæa cinxia*, including one pale and other vars.; the same number of *M. athalia*, "one with light fore wings and dark hind wings (*eos*, Haw.)," was knocked down at £6 10s.

A variety of *Vanessa io*, with the hind wings devoid of ocelli, brought in £5; the aberration of *V. atalanta* figured in the 'Entomologist' for 1878 realized 10s. more; the bidding for a variety of *V. cardui*, figured Entom. vi. 345, did not cease until the sum of £6 10s. had been offered; but the price for another example of the last-named species, similar to that figured in Newman's 'British Butterflies' (p. 64) went up £1 10s. higher.

A black example of *Limenitis sibylla* was disposed of at £1 17s. 6d.; whilst another example, with the upper surface almost black and the under surface dark, fetched 3 guineas. One dark variety of *L. sibylla*, one example of *Apatura iris* with white markings almost absent, and other specimens of each species, were cleared at £1 10s.; and the same price was given for one very dark specimen of *A. iris* and three females of the same species.

Two examples of *Melanargia galatea*, both figured in the 'Entomologist' for 1876 (p. 193, 2nd and 3rd figs.), were sold for 2 guineas;

but the next lot, which comprised another aberration (1st fig., *l. c.*), one very dark example and four other *M. galatea*, with some *Erebia blandina*, commanded £7.

An almost unicolorous orange variety of *Pararge megæra* sold for £5; whilst a lot containing five *Epinephele ianira*, "with curious colourless patches," and an example of *E. tithonus* without ocelli, went for £1 5s. A unicolorous light brown variety of *E. ianira* realized £2 10s. A cream-coloured aberration of the same species brought £4. A variety of *E. tithonus* with costa and margins of fore wings lighter than the disc (Ashburton, 1864), ran the bidding up to £5 10s.; whilst an "exceptionally fine white" aberration of the same species went for £1 12s. 6d.

Three varieties of *Chrysophanus phlœas*, which were put up separately, produced a total of £10 15s.; the prices were £1 15s. for an exceptionally fine dark example, £4 for a fine silver specimen (var. *schmidtii*), and £5 for a "magnificent golden variety."

An aberration of *Lycæna icarus*, described as a "remarkable underside var.," sold for £2 10s. A double lot of fifty-three *L. icarus* and *L. adonis*, including a "curious buff var." and four under-side vars. of the latter species, was disposed of for £2 10s.

A lot of "skippers," including a silvery variety of *Hesperia comma*, brought £1 10s.

Gyandromorphous Specimens.

Colias edusa: male on the left side, female on the right, £3 10s.

Thecla quercus: male on the right side, female on the left, £3 15s.

Lycæna icarus (*alexis*): male on the right side, female on the left, £3.

(To be continued.)

Dragonflies congregating at Seaside. — On the first Monday in October last, a warm sunny morning, I was on the new pier at Brighton, and noticed a number of dragonflies—possibly two or three hundred—basking in the sun on the shelters and elsewhere. The distance from fresh water, two or three miles, seemed strange to me. I had no means of securing a specimen to be certain which species it was, but think it would most probably be *Sympetrum striolatum*. I may add that the insects did not appear to be *coming* or *going*. Just as I say—basking in the sun on the band-stand, &c.—(Mrs.) Alice Trollope; Hawthorndene, Tunbridge Wells, March 19th.

Lycæna corydon var. fowleri.—It may be worth noting that a male specimen of this variety, which my brother and I possess, is without the black dots on the outer margin of the hind wings, which are depicted in the plate and also mentioned in Mr. South's description (*vide* p. 104); the insect thus having a white border interrupted only by the black nervules.—Fred. G. Bellamy; Ringwood, April 6th, 1900.

Alien Earwigs established at Bow.—At the end of March, while searching for beetles amongst a store of boxes in some soap-works at Bow, in the east end of London, Mr. E. C. Bedwell found two species of earwig. Although not particularly interested in the order to which they belong, he secured a few specimens. They turn out to belong to the same two species that Mr. J. J. Walker found established under somewhat similar conditions at Queenborough, in Sheppey—viz. *Anisolabis annulipes*, Luc. (Entom. xxx. 125), and *Apterygida arachidis*, Yers. (Burr, Brit. Orthop. 17). — W. J. Lucas; Kingston-on-Thames, April 5th, 1900.

The Pupal Habits of Cossus ligniperda. — Mr. Adkin's note upon this subject (*ante*, p. 128) appears to me to somewhat understate the case. While admitting that I have found pupa-cases, both on the ground and even at some considerable distance from any possible feeding-place for the larva, my experience shows that for the most part the cases have been found protruding from the burrow in which the larva has fed. *C. ligniperda* is so plentiful in this district as to be a pest, and five years ago a large willow-tree was killed outright by the devastation of this insect. One evening I took seventeen specimens (apparently just emerged) from the trunk of that tree, and at least twice as many pupa-cases were to be seen projecting from holes in which the larvæ had wrought their deadly work. Moreover, I was fortunate enough to witness in one case the emergence of the imago: the pupa projected about three-quarters of an inch from the trunk, and was about three feet from the root; it split laterally, and the anterior portion fell to the ground, leaving the posterior part sticking in the hole. In those days my entomological knowledge was very superficial, but the circumstances of that occasion are particularly impressed upon me, as my companion was unfortunate enough to discover a nest of wasps, but, unluckily for him, not until after they had discovered him. Our studies of the habits of *Cossus ligniperda* cost him three weeks in bed.—William A. Carter; Burr Villas, Bexley Heath, Kent, April 9th.

SOCIETIES.

Entomological Society of London.—*March* 21*st*, 1900.—Mr. C. O. Waterhouse, Vice-President, in the chair. Mr. R. T. Cassal, of Ashby, near Doncaster; Mr. Neville Chamberlain, of Highbury, Moor Green, near Birmingham; Mr. E. A. Elliott, of 41, Holland Park, W.; Mr. H. Willoughby Ellis, of Knowle, Warwickshire; Mr. J. H. Keys, of 6, Seymour Terrace, Lipson, Plymouth; the Rev. W. J. Leigh Phillips, M.A., of The Cottage, Parkwood Road, Tavistock, Devon; Mr. H. W. Shepheard-Walwyn, M.A., of Glensyde, Bidborough, near Tunbridge Wells; and Mr. C. J. Watkins, of Kings Mill House, Painswick, Gloucestershire, were elected Fellows of the Society. Mr. R. McLachlan exhibited an extraordinary aberration of *Enallagma cyathigerum*, Charp, taken by Mr. Morton at Glen Lochay, Scotland; the remarkable feature consisted in the predominance of black over blue in the coloration of the abdomen. Mr. M. Burr exhibited a macropterous variety of *Xiphidium dorsale*, Latr., captured by Mr. Harwood near Clacton, remarking that the fact of this species presenting a macropterous form was apparently unrecorded hitherto. Mr. W. J. Kaye exhibited *Nyssia hispidaria*, an asymmetrical specimen taken on Wimbledon Common, the left fore wing of which was perfectly developed, but extremely small, and the left hind wing slightly more elongated than the right hind wing. Mr. C. O. Waterhouse exhibited a tube which formed the entrance to a nest of a *Trigona*, sent from Singapore by Mr. H. N. Ridley. It was about fifteen inches in length, of a resinous substance, but more waxy towards the end, which was spoon-shaped. He also exhibited a portion of the resinous mass formed within the trees by these bees, and stated that one of these masses sent from Penang by Mr. Ridley weighed fifteen pounds. The true nest of the *Trigona* consists of an irregular mass of cells filled with honey, quite distinct from the resinous formation. A paper was communicated by Mr. W. H. Ashmead, Assistant-Curator of the United States Natural History Museum, on "The Aculeate Hymenoptera of the Islands of St. Vincent and Grenada, with additions to the Parasitic Hymenoptera, and a List of the described Hymenoptera of the West Indies."

April 4th.—Mr. G. H. Verrall, President, in the chair. Mr. J. W. Carter, of 25, Glenholme Road, Manningham, Bradford; Mr. L. L. Feltham, of Johannesburg, South Africa; and Mr. H. Fortescue Fryer, of the Priory, Chatteris, Cambs, were elected Fellows of the Society. Mr. M. Jacoby exhibited specimens of the genus *Sagra* from Eastern Asia. Mr. M. Burr exhibited three species of Pseudophyllidæ, two new species of *Capnoptera* (females), and *C. quadrimaculata*, Westw. (female), collected in the Siamese Malay States by Mr. M. Annandale. One of the specimens illustrated the peculiar methods of offence adopted by the insect when alarmed. Between the head and the pronotum a scarlet hood was visible, the inflation of which bladder-like organ always indicates fear or anger. The other specimens showed the natural position of the head and pronotum. Mr. H. J. Elwes communicated a paper on "Bulgarian Lepidoptera," and made some remarks on the more notable species which he had taken in the Balkan Peninsula during the months of June and July, 1899. The number of species of Rhopalocera captured was 120, which, with a further twenty recorded by Haberhauer and Lederer, brings up the total to 140. The mountains visited were an extension of the Rhodope range, where the climate was particularly rainy, a great number of ferns flourishing everywhere, in contrast to the drier Balkans, where the number of species of Rhopalocera is not less than 200. Some interesting forms, but no new species, were encountered. A variety of *Colias myrmidone* occurred much larger and brighter than the Austrian, and more nearly agreeing with the Ural form; and whereas in Austria the white aberration is exceedingly rare, in this locality it predominated. Meanwhile the orange forms clearly resembled *C. heldreichi*. The form of *Cœnonympha davus* met with showed an affinity with the Asiatic and not the European form, being almost precisely similar to specimens taken in the mountains of Armenia by Haberhauer. The form of *Argynnis pales* was intermediate between that found in Greece and the Central European Alps, while a form of *Erebia* var. *gorgone* was taken similar to that in the Pyrenees—a curious instance of interrupted distribution.—C. J. Gahan & H. Rowland Brown, *Hon. Secs.*

South London Entomological and Natural History Society.—*March 8th*, 1900.—Mr. W. J. Lucas, President, in the chair. Mr.

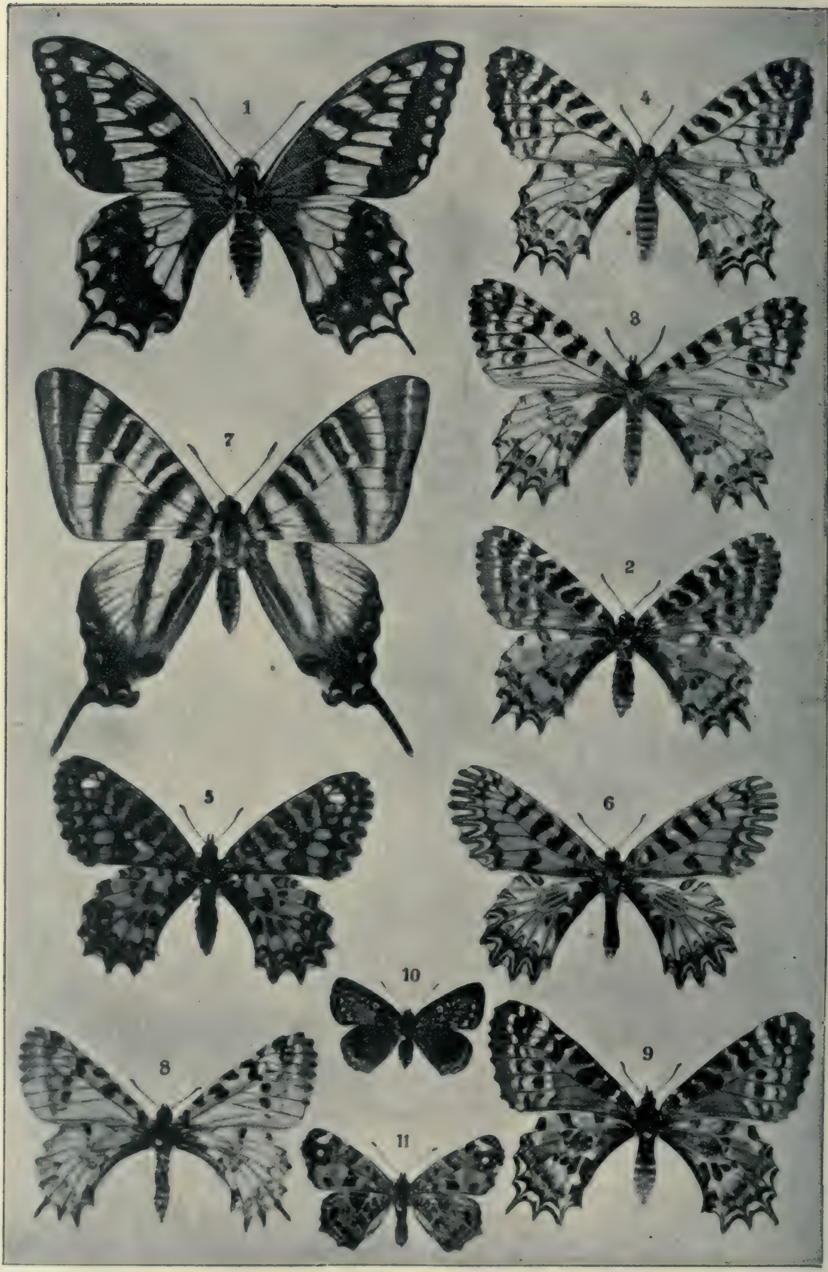
Harwood exhibited a species of *Blatta* from the Eastern Counties, which was apparently new to Britain. Mr. Adkin, a bred series of *Eugonia autumnaria* from Bournemouth. Mr. Colthrup, a specimen of *Euchelia jacobææ* with the red areas unusually pale, a very beautifully marked variety of *Eurrhypara urticata*, and very small examples of *Pieris rapæ*, including a yellow variety. Mr. Lucas, living specimens of the immature stage of *Blatta australasiæ* from Kew, and a case containing examples of the whole of the British cockroaches, with drawings of several species. Mr. Main, living specimens of *Blatta americana* from Silvertown. Mr. Edwards, living specimens of *Phyllodromia germanica*, male, female, and immature. Mr. Moore, numerous exotic species of cockroaches. Mr. Tutt, a long and varied series of *Epunda lutulenta*, taken at Mucking, Essex, by the Rev. E. Burroughs in 1898–9, and contributed notes as to the occurrence and variation of the species. Mr. Lucas read a paper entitled "Cockroaches: Natives and Aliens," illustrating it with numerous lantern-slides.

March 22*nd*.—The President in the chair. Mr. MacGee, of Lillie Road, S.W., and Mr. J. Platt-Barrett, of Margate, were elected members. Mr. Montgomery exhibited specimens of a second generation and a partial third brood of *Coremia designata*, and gave notes on their life-history and variation. Mr. F. N. B. Carr, a varied series of *Hybernia leucophæaria* from Lee.—Hy. J. Turner, *Hon. Report Sec.*

Birmingham Entomological Society.—*March* 21*st*, 1900.—Mr. G. T. Bethune-Baker, President, in the chair. Mr. Charles Carey Woods was elected a member of the Society. The President referred to the death of Mr. W. G. Blatch, who, he said, was the first President of the Society, from 1888 to 1893. Mr. P. W. Abbott showed long series of several species of Lycænids, particularly a very fine lot of *Lycæna alexis*, including blue forms of the female from Ireland; also some of the white-bordered forms of *L. corydon* taken by Mr. T. H. Fowler on the Dorset coast. Mr. G. T. Bethune-Baker also showed many fine Lycænids; very small *L. alexis* from Algeria, almost as small as *minima*, and blue females from various localities; also ab. *ceronus* of *L. bellargus*, &c. Mr. C. J. Wainwright showed a boxful of Syrphids, chiefly containing the genus *Eristalis*. Mr. A. H. Martineau showed some Aculeates collected by Mr. Wainwright, including the very rare *Crabro pubescens* (male), one specimen, from the New Forest; he said that less than a dozen specimens of the species had at present been taken in the country. Mr. R. C. Bradley read a paper upon mosquitoes, in which he described the life-history of the common Culexidæ, and gave some account of the connection between *Anopheles* and malaria, exhibiting in connection with the paper various British species of the family. A discussion followed, in which various members gave their experiences of the biting habits of these insects at home and abroad, and also discussed the origin of the habit, &c. Mr. G. H. Kenrick believed the habit had begun through sucking juices of plants; Mr. Neville Chamberlain said that he believed people in time became quite inoculated against the effects of the bites; when he first went to the Bahamas he suffered very much, but after a time they did not seem to hurt him at all.—Colbran J. Wainwright, *Hon. Sec.*

PLATE I.

(Entom., Pl. V., 1900)



After Obernetter.

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SYNOPSIS OF EXPERIMENTS IN HYBRIDIZATION AND TEMPERATURE MADE WITH LEPIDOPTERA UP TO THE END OF 1898.*

By Prof. Dr. Max Standfuss.

Plate I. (Entom. Plate V.).

Synopsis of temperature and hybridization experiments hitherto undertaken, supplementary to the work.

"Experimental Zoological Studies with Lepidoptera," and with additions containing the principal results obtained during the year 1898, in continuation of these experiments.

The studies in question are in two directions, of which to the one, Temperature Experiments, I have given my attention for twelve years; and to the other, Hybridization Experiments, for twenty-five years.

For the first, 42,000 specimens of about sixty different species have been used, and for the second, more than 38,000 specimens of over thirty species.†

The Lepidoptera are for many reasons the best suited for such experiments. Firstly, the material can be taken directly from nature; and, secondly, many species can be used in large numbers. At the same time the life-history of the creatures is very short, many species even in our latitude having two generations in the course of a year; and, finally, the different phases of their varying metamorphoses give an opportunity and possibility of making many observations of a biological, physiognomical, and physiological nature, owing to their generally highly characteristic features.

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* Translated from the German by Edward Martin Dadd.

† During the year 1898, 4800 specimens were used for temperature, and 3200 specimens for hybridization experiments.

Firstly, the Temperature Experiments.—The temperature experiments which concern us here (searching temperature experiments in other directions are mentioned in my 'Handbuch der palaearktischen Gross-schmetterlinge,' pages 137–153) have been chiefly devoted to the pupal stage, and may therefore be considered as a continuation and supplement of the methodical experiments first made by G. Dorfmeister, Aug. Weismann, and W. H. Edwards in the sixties and seventies.

To the experiments begun by others must be added experiments made by me in quite another direction, relating to inheritance of the new characters acquired by these experiments.

The studies of the three gentlemen in question related chiefly to the appearance in nature of Wallace's so-called "Seasonal Dimorphism." What is seasonal dimorphism? The fact that species which attain the imago stage twice or more during the course of a year generally exhibit marked differences in the size, shape, or colour of the imagines of these two generations.

The most noteworthy example is to be found in our smallest *Vanessa*, the so-called map-butterfly, *V. levana*, L., in which the difference between the imagines from hybernated pupæ and those of the summer brood are so great that the two forms were for a long time considered to be two different species. This insect was therefore one of the first to be experimented with by Dorfmeister and Weismann. Weismann, to whom we owe the best work on this subject, which appeared in 1875, placed the summer pupæ of *V. levana* for twenty-four weeks in an ice safe or ice cellar, and winter pupæ in a conservatory with a temperature of + 15° to + 30° C. By this means the summer form was changed directly to the winter form; but, on the other hand, it was found to be very much more difficult to change the winter form by warmth to the summer, and in most cases it was an entire failure. Weismann concluded therefore that the species was a northern one, and that the winter form *V. levana* was the oldest and most constant, and the summer form—var. *prorsa*—a later innovation, that is to say, only recently introduced into the life-history of the species.

This supposition is probably correct, as the species no doubt emanates from Northern Asia, where there are to be found four nearly related species, the only living relatives of this insect on the earth; and, moreover, *V. levana* itself is found there, in some places actually with only one generation in the year from hybernated pupæ—for example, at Nicolajefsk and Chabarofka. Var. *prorsa* is therefore a recent introduction, which, by lowering the temperature of the pupal stage, can be immediately made to resume its ancient characters. The "phylogenetic"—or, we may well say, the younger—form can be directly changed to the older. Further experiments with *Papilio ajax*, L., *Pieris napi*, L., *Polyommatus phlœas*, L., *Pararge egeria*, L.—all species which exhibit seasonal dimorphism—led to analogous results.

As far as Dorfmeister, Weismann, and Edwards are concerned up to the year 1875, all three of them dealt with a species *by and for itself*, as an isolated type relative to the action of various degrees of temperature, during the pupal stage on the resulting changes in character of the species, within its own limits, without considering their relationship to those of other species. As a matter of fact, the species experimented with up till that time were not especially suited to open up further phylogenetic research.

Exactly ten years later I commenced analogous experiments, although not to any great extent until 1893, as my hybridization experiments, which were commenced in 1873, and carried on later in conjunction with the temperature experiments, took up a good deal of my time until then.

Ever since the year 1888 the English entomologist Merrifield has been making experiments in the same direction, and since that time has published a number of papers on this question in the 'Transactions' of the Entomological Society of London. Weismann has also continued his experiments lately, and numerous other younger entomologists are now making similar experiments.

The temperature experiments made by me can be naturally divided into two groups. On the one hand, by using constant high temperatures of +37° to +39° C., in which the pupæ were placed three or more days; or by constant low ones of +4° to +6° C., which lasted four to eight weeks. We will call these, shortly, warmth and cold experiments.

The first were made in the developing apparatus of the Polytechnic Seed Culture Station, Zurich, whose Director, Dr. G. Stebler, has assisted me in the kindest and most willing manner. For the second, I have used an ordinary ice safe, as is used for keeping food in many households.

After the treatment with cold the pupæ remained for some time in an ordinary temperature till the imagines emerged. This was also usually the case with the warmth experiments, very few pupæ remaining in the forcing apparatus until they were fully developed.

On the other hand, I made experiments which could be termed heat and frost experiments, the temperature being only intermittently applied—two to seven hours at a time—because only capable of being endured for short intervals.

The heat experiments were carried out with the help of the forcing apparatus at from +40° to +45° C.

The degrees of cold, 0° to −18°, exceptionally to −20° C., were procured at the freezing apparatus of the Institute for

Testing Building Material, whose Director, Prof. L. Tetmayer, has assisted me in these experiments in the kindest manner.

Firstly, warmth and cold experiments. The principal results of these are dealt with in the 'Handbuch der palaearktischen Gross-schmetterlinge,' and are summarised as follows :—

Species from northern sources—that is to say, species which themselves, as well as the majority of their relatives, live in northern regions, and would therefore probably emanate from there—give retrogressive forms by the application of cold, but progressive forms by the application of warmth.

On the other hand, species of southern origin, mostly species which have penetrated from the south in a northerly direction, and whose relatives are entirely, or nearly so, denizens of tropical and subtropical regions, produce retrogressive forms by the application of warmth, and progressive forms by the application of cold.

In all cases as yet dealt with the retrogressive and progressive forms indicate :—

1. That seasonal forms are obtained, that is, forms whose appearance is constant at certain seasons of the year. Apart from the well-known case of *V. levana*, L., and its var. *prorsa*, L., of Dorfmeister and Weismann ; *Vanessa c-album*, L., can be changed by cold from the first or summer generation to the second or autumn generation, and the second generation partly to the first by the application of warmth. We have good grounds for the belief that *V. c-album* is a northern insect, and that its autumn form is the more ancient, the summer form being a recent introduction—that is to say, the younger. This would explain the fact why the first generation retrogressed, and the second generation progressed by this experiment. Large numbers of the summer generations of *Papilio podalirius*, L. (Wallis), *Pieris daplidice*, L. (Berlin), and *Polyommatus amphidamas*, Esp.* (Leipzig) produced by the application of cold the forms from hybernated pupæ only.

2. Local forms can be obtained—that is, forms which in certain localities are found as local races. I succeeded in obtaining *Vanessa urticæ*, L., var. *polaris*, Stgr., of Lapland, direct from Zurich pupæ by submitting them to low temperatures, and forms approaching var. *ichnusa*, Bon., of Corsica and Sardinia, with high temperatures. As *V. urticæ* is also probably a northern species, var. *polaris* would be the older, and var. *ichnusa* the newer form.

The change effected in the swallow-tail, *P. machaon*, through the influence of warmth, were especially noteworthy. By special manipulation imagines were obtained from pupæ of the summer form from Zurich, which approached in a marked degree those found in July and August in Syria and sometimes at Antioch and Jerusalem. Further, the second generation of *P. podalirius* from Wallis can be changed by warmth to the more characteristic summer form of southern localities—that is, the typical var. *zanclæus*, L., of Sicily, and so forth.

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* The contrary was also successful with *P. amphidamas*, Esp., a direct change of the winter generation to the summer generation being obtained in the majority of cases by placing the pupæ at the end of March and beginning of April for eleven to fourteen days in a temperature of + 37° C.

3. Changes in the direction of sexual colour dimorphism. By warmth the female of *Parnassius apollo*, L., from Wallis, was entirely changed to the male type of coloration, and the male had the dark spots on the outer margin of the fore wings replaced by white. Sexual colour dimorphism must certainly only be regarded as a link in the chain of the normal development of the species, and in the case before us—as, indeed, it seems to be the rule—the male is the newer type, and the female the older. Therefore in our experiment the older female type was changed to the newer male type, and the male evolved still further in a progressive direction.

It is also noteworthy that the dead whitish colour of the female *Rhodocera rhamni*, L., is changed by warmth to the intense yellow male coloration, either totally or partially. This important change in the coloration of the female is not so much a phylogenetic as a physiological matter, as is shown by the correlation between the colour and the genital organs. In some of these warmth experiments, and especially in the case before us, certain female specimens underwent a certain amount of damage and malformation to the sexual organs, and this malformation seemed to be directly connected with the change of the female colour.

4. Phylogenetic forms* in their truer sense—that is, forms which at present do not occur on the earth, or only very rarely.

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* In February, 1898, a large number of *P. hospiton*, Géné (pupæ from Sardinia), were made to approach *P. machaon* in wing-outline and markings by warmth. The fore wings were much more extended, the tail of the hind wings lengthened, the yellow half-moon spots on the outer margins of the upper sides of the fore and hind wings, and the red eye-spot at the anal angle of the hind wings were noticeably increased in size, and in some specimens yellow scales were sprinkled thickly on the black base of the fore wings on the upper side, and on the broad black bands near the outer margin; all of these changes are approaches to the type of *P. machaon*, L. Pl. I. fig. 1 shows a female specimen which shows the change in the shape of the wing very plainly.

It appears therefore as if *P. hospiton*, which, as is well known, inhabits exclusively the mountain regions of Corsica and Sardinia, and whose claim to the title of a separate species, as well as *Argynnis elisa*, God., and *Satyrus neomiris*, God. (also species indigenous to Corsica and Sardinia), are chiefly owing to its insular isolation, obtained certain changes in colour and wing-structure, both with a correlative relationship to each other, from the nearly related *P. machaon*, during some past epoch of low temperature. It is a fact that *P. hospiton* is inclined to converge with *P. machaon* in several directions by a slight increase of temperature.

(a) Forms which belong to the former history of the species—that is, true retrogressive forms. They can be recognised at once by their approaching in markings to related species or forms which are recognised as nearer the original type of the genus.

V. polychloros, L., for example, by the application of cold, obtained a row of blue spots on the outer margin of the upper side of the fore wings, which are usually wanting, but which are still present in the nearly related *V. urticæ*, L.; and *V. io* also approached *V. urticæ* both on the upper and under sides. *V. antiopa* obtained quite noticeably two spots on the upper side of

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Another fact which shows the effect that low temperature has had on *P. hospiton* is that it has only one generation during the year, whereas *P. machaon* in nearly the whole of its widely extended area has two generations yearly.

Up till now I have bred 583 specimens of *P. hospiton*, but only during the abnormally hot year 1898 did I obtain a few specimens during the month of August from fresh pupæ from Sardinia before hybernation. These are intermediate between the ordinary form and the forms obtained by the experiment.

The results obtained by warmth in changing the three *Thais* species and their local forms—*cerisyi*, B., var. *deyrollei*, Obthr., *rumina*, L., *polyxena*, Schiff.—are worth noting.

One hundred and fifty pupæ of the local form of *T. cerisyi*, B., from Amasia, var. *deyrollei*, Obthr., were subjected in February for nine to fifteen days to a constant temperature of + 37° C. until emergence. About one-third of the female specimens obtained a brownish coloration of the ground colour of both wings on the upper sides in place of the white tone and a weak discoloration of the under sides, mostly accompanied by an increase in size of the black markings. This form is rarely obtained in ordinary circumstances. The most extreme forms reached on the upper side, the brown-yellow of typical *rumina* ab. *canteneri*, Stgr., from Malaga. Pl. I. fig. 2 shows one of these dark brown female specimens obtained by this experiment, but the black markings are only increased somewhat on the fore wings.

In the male specimens obtained by the same treatment a noticeable darkening of the light ground colour was only exceptionally present, but nearly always, though not to any extent, there was a slight increase in the size and number of the black markings, at times accompanied by an enlargement of the red spots of the hind wings.

The male (Pl. I. fig. 3) shows these characters. Its markings thus attain a growing resemblance to the light female forms of *Thais* var. *deyrollei*, Obthr., which occur regularly at Aintab, north-east of Antioch (Syria). We concluded (Standfuss, Handb. d. palaearct. Gross-schm. 1896, pp. 226, 227) that these female types from Aintab were the most progressive, because they were the nearest approach to the male type of coloration; and those retrogressive males procured from the Amasia pupæ by warmth are a still nearer link to the above-mentioned female Aintab types. A female from Aintab is shown (Pl. I. fig. 4) whose pupa has not been experimented with.

A few male specimens obtained by the experiment a very curious addition to their wing-structure, a portion of the hind wings with the three long tails being lengthened: so that there was a certain resemblance to the type of hind wings of certain *Papilio* species—*P. podalirius*, L., for example.

Ninety-three pupæ of *Thais rumina* from Portugal produced, under a temperature of + 37° C. after hybernation during January and February in six to fifteen days, a similarly dark brown type, mostly with an increase of the fore wings, in the exact position that they still occupy in *V. urticæ* and *V. c-album*, and other related species.

(b) Forms which possibly indicate the future line of development of the species. These would then be true progressive forms. They are characterised by their departing still further from the ancient genetic type, and from related species. In most of the species of *Vanessa* from northern sources hitherto experimented with, these forms are usually obtained by warmth, especially with *V. antiopa.* Only the species of southern source, *V. cardui*, L., and *V. atalanta*, L., produced them with cold.

(To be continued.)

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size of the black markings, as well as intermediate forms, altogether thirty-four specimens. This form was much rarer in the males (seven specimens), and not nearly so extreme as the females (twenty-seven specimens). One of the females is shown Pl. I. fig. 5. This type, Staudinger's ab. *canteneri*, is of rare occurrence in South Spain (Andalusia) and North Africa. The ab. *canteneri* was not at all rare in pupæ from Malaga, but I never had them in anything like the numbers that I obtained from the pupæ from Portugal, with which I made this experiment, and then mostly when the insects emerged without any treatment during the autumn (September and commencement of October) before hybernation.

No ab. *canteneri* were obtained from the Portugal pupæ treated in the usual manner.

Four hundred specimens of *Thais polyxena*, Schiff., from Vienna, treated for this warmth experiment, produced under + 37° C., in eight to twelve days, twenty-six specimens of ab. *ochracea*, Stgr., the analogous form to ab. *canteneri*, and a fair number of intermediates. A collateral tendency to an increase in the dark markings was not manifested, but a preponderance in numbers and extremity of variation in the females (sixteen specimens) to males (ten specimens); Pl. I. fig. 6, shows us one of these experimentally browned males. I have never yet seen or bred specimens from Vienna, which are as dark as the most extreme form obtained in the experiment, and occasionally, under ordinary treatment in large numbers, forms nearly approaching in density of marking, from Budapest pupæ and from the neighbourhood of Mehadia.

The most extreme form obtained by the experiment approaches very nearly *Thais polyxena* var. *polymnia*, Mill. aberratio (*cf.* Millière, Lepidoptérologie, septième fascicule, 1881, pp. 2–4, pl. x. fig. 5) which comes from the island of Eubœa, and is perhaps the most extreme form of ab. *ochracea*, Stgr., as yet known.

The results obtained by these warmth experiments with these three *Thais* species are that under similar treatment more or less similar developments are obtained, to which the female sex, both in number of specimens and intensity of variation, are almost exclusively subject, leads one to the supposition that this is a case of retrogression.

As to the fact that a lighter or darker tone of brown as ground colour is common to many families as well as Rhopalocera, refer to the work of Alf. G. Mayer, "On the Color and Color Patterns of Moths and Butterflies" ('Proceedings' of the Boston Society of Natural History, Boston, vol. xxvii. 1879).

THE TYPE OF *THECLA*, FABR.

By A. G. BUTLER, Ph.D.

IN Marshall and De Niceville's 'Butterflies of India,' vol. iii. p. 298, Mr. de Niceville observes:—"In taking *T. spini*, Wiener Verzeichniss, which occurs in Europe and Northern and Eastern Asia, as the type of the genus *Thecla*, I follow Mr. S. H. Scudder, Mr. W. F. Kirby, and Messrs. Godman and Salvin, rather than Mr. A. G. Butler, the last adopting *betulæ*, Linnæus, a European and North Asiatic species. The latter is, however, the type of Dalman's genus *Zephyrus*."

In Dr. Scudder's "Historical Sketch," the plan adopted for deciding what the type of a genus is, to either take the omission of species (noted under the original description) by subsequent authors as restrictive, and applying the generic name to the residuum; or, where no reduction has been made, to accept the dictum of the first subsequent author who indicates a type. If neither action has been taken by a previous author, Scudder himself fixes the type, selecting one of the original species.

If Dr. Scudder had followed his own rule consistently, there would have been no reason why his decisions should not have been accepted as final; but in one case he ignores a genus because he says it consists of heterogeneous material, whereas, in another case, he extracts a heterogeneous species from the middle of a crowd in order to upset a properly constituted genus based upon that insect (vide *Cythærias*, which is absolutely synonymous with *Hetæra*), cf. *Graphium*, *Pterourus*, &c.

On Scudder's own showing, Leach, in 1815, included *betulæ*, *pruni*, and *quercus* under *Thecla* (omitting *spini*); therefore the subsequent action of Dalman in taking *betulæ* as type of his new genus *Zephyrus* was valueless, unless it could be shown that *T. betulæ* and *T. quercus* represented different genera. To resuscitate *spini* as type of *Thecla* is to ignore the restrictive plan by which Scudder himself was generally guided, and thus reduce the firm basis upon which the type question was being settled, to the quaking bog of earlier times. We want no autocratic authority to step in and assert that "in this case the restriction of a genus may be conveniently ignored," but a definite rule, without exceptions, which all may be able to follow.

Under the circumstances, there is not the slightest question that the type of *Thecla* must be either *betulæ* or *quercus*, and, until some structural character is discovered by which these two species can be generically separated, *Zephyrus* must be regarded as a synonym of *Thecla*, the general opinion and decision of entomologists up to 1872, that *betulæ* was the type, being accepted.

ON THE MORPHOLOGY AND CLASSIFICATION OF THE AUCHENORRHYNCHOUS HOMOPTERA.

By Dr. H. J. Hansen.

(Continued from p. 120.)

4. *Fulgoridæ.*

In this family I have closely examined the antennal structure in *Fulgora ocellata*, Westw. (or a very nearly related species), *Dictyophara europæa*, L., *Calyptoproctus stigma*, F., *Cixius nervosus*, L., *Eurybrachys* sp., *Calliscelis bonellii*. Latr., *Issus coleoptratus* Geoffr., *Ricania* sp., *Pœciloptera phalænoides*, L., *Tettigometra costulata*, Fieb., *Aræopus crassicornis*, Fabr. *Megamelus notula*, Germ., *Stenocarenus minutus*, F., and *Liburnia limbata*, Boh. I also examined a large amount of material with a lens.

The antennæ are situated beneath the eyes, generally far behind under the hindermost part of the eyes, or even behind that (*Fulgora*), sometimes under the front part of the eyes in an excavation in them (*Bothriocera*). They are not sunk into antennal pits, but the basal segment of the peduncle is connected with the chitin of the genæ (cheeks) by a broad—sometimes extraordinarily broad—segment-membrane (pl. i. f. 11). They are entirely different in structure from the other families, and, indeed, from what is known, apparently, in other insects.

The essential points in the antennæ of the Fulgoridæ are, briefly: the *second* segment of the peduncle—which is never very much smaller, but generally both longer and thicker than the first—is provided with *numerous large peculiarly formed (compound) sensory organs;* the flagellum consists of a moderately small, nearly pear-shaped *basal segment, which bears a single sensory pit with a single spike*, and of a *thinner, segmented or unsegmented bristle, without trace of sensory organs.*

Viewed through a lens, the surface of the second segment of the peduncle in a large Fulgorid of the typical subfamily (e. g. *Fulgora*, *Calyptoproctus*) is seen to be strewn with numbers of dark small "nodes" (pl. i. f. 11); examined in an alkaline preparation more closely through a microscope, each of the "nodes" is readily seen to consist of a circle of conical dark chitinous pegs, which protrude and converge somewhat towards the centre of the ring; the area within the ring is filled with numerous conspicuous thin generally irregularly bent rounded-above lobes (f. 11, a, g, b, and 12), which are probably the seat of a sense. Each of these nodes I have named a "compound sensory organ." In *Fulgora* the nodes are strewn very closely over the whole of the surface of the second segment; in *Calyptoproctus* a part of the surface is smooth; in *Dictyophara* and *Cixius* the nodes are far fewer in number, but very similar in structure, though the sensory-lobes are fewer also in number. In *Eurybrachys*, *Calliscelis bonellii*, and *Issus coleoptratus*, the surface of the second segment of the peduncles is strewn with numerous small pointed nodes and a number of bristles; the sensory organs are fewer in number in the two last-named genera (pl. i. f. 14 and 13), and in all three genera they *lack the protecting ring of chitinous pegs*, while the lobes in each organ are numerous in *Eurybrachys*, far fewer in the two other genera (f. 13 a). In a *Ricania* sp. the second segment of the peduncle is of scarcely greater magnitude than the first; the sensory organs are situated only on the terminal face, are few in number and small in proportion (pl. i. f. 15). They are distinguished by each one possessing only one or two lobes, while their margins are bent up in peculiar ear-shaped processes, outside each of which there is a conical spike. In *Pœciloptera phalænoides* (pl. i. f. 16, 16 a) the sensory organs are still smaller in size, but are very similar in appearance to *Ricania*, though not so clean cut. The sensory lobes number only one or two. In *Tettigometra costulata* (pl. f. 17) the second segment of the peduncle is proportionately very large, and so oblique that the flagellum is articulated far from the apex on one of the sides. The sensory organs are proportionately very numerous and large; the protecting circlets of chitinous pegs are (as in *Issus*) wanting; but the rest of their structure is very obscure. Apparently all of the almost circular sensory areas are each covered (f. 17 a) with a thin membrane, which is extremely finely punctured, and on which there are usually one to four irregular elongate shallow keels, which thus agree with the lobes in the previously described Fulgoridæ. In the *Delphax* group (of which I have examined *Aræopus crassicornis*, *Megamelus notula*, *Stenocarenus minutus*, and *Liburnia limbata*), one meets with a structure singularly characteristically distinguishing it from the other Fulgoridæ. The second segment (pl. ii. f. 1) is strewn with isolated large bristles and numerous small bristles, and the sensory organs are, in proportion to the size of the insect, rather numerous and very conspicuous. The chitinous pegs in the circles surrounding each organ are strikingly few in number, and of a considerable size (pl. ii. f. 1a); instead of sensory lobes there are on the membrane within the circles *only bristles*, which in *Stenocarenus* and *Megamelus* differ but little either in form or size from the small bristles strewn on the remainder of the surface of the segment, except that those lying within the circles are noticeably thicker than those without, while in *Liburnia* they are far thicker, somewhat shorter and coarser, and far more curved than the normal small bristles;

and, finally, in *Aræopus* they are notably shorter and coarser, and also far more closely set than the other small bristles of the segment; at the same time they have preserved entirely the character of bristles.

The bristle-shaped part of the flagellum is sometimes relatively long (*Calliscelis*), sometimes short (*Fulgora*, *Tettigometra*); sometimes with very distinct segmentation throughout the whole, or in great part of its length (*Tettigometra*, *Aræopus*, *Megamelus*), sometimes without segmentation (*Fulgora*, *Issus*, *Calliscelis*).

While the condition of the flagellum does not appear to have any wider systematic significance, on the other hand the detailed structure of the sensory organs on the second segment of the peduncle appears to possess such a value to a pre-eminent degree. I must lament that I have not been in a position—from want of material—to examine a far greater series of special genera. The *Delphax* group, so sharply characterized in other ways, appears also admirably defined by its antennal structure; on the other hand, I am not in a position to say that *Tettigometra* is clearly so distinguished, since I am without the forms which Stål places in their neighbourhood; moreover, I cannot define sharply marked boundaries for the *Ricania-Flata* groups, and I have not been able to examine microscopically any examples of the Stålian groups *Achilida*, *Tropiduchida* and *Derbida*. There thus remains a considerable gap in my researches.

B. *Tegulæ and Wings.*

Tegulæ are found only in the Fulgoridæ. In this family they are, moreover, almost universally present, generally readily enough seen, but sometimes covered over by the lateral margins of the prothorax. Stål says (Hemipt. Afr. 128) that they are absent rarely, but does not mention the precise genera in which this is the case. The only genus examined by me, in which I have not been able to see them, is *Calliscelis*, a genus characterized, among other things, by the strongly reduced wings. Their presence is thus typical of, and peculiar to, the Fulgorid family, but at the same time they can be absent or reduced almost to the vanishing point (which is certainly concomitant with a great reduction in the flight organs), so that their absence is not an absolute character.

I have but little to add on the subject of *Wing-Neuration.*

In the *Cercopidæ* a part of the anterior margin of the posterior wings (in *Cercopinæ* and *Aphrophorinæ* near the base itself, in *Machærota* in the middle between the retinaculum and the base) is expanded into a triangular projection (pl. ii. f. 2 a), whose upper and outer margin bears a few posteriorly directed hooks, which are fixed on a thicker, firmly chitinized base (f. 2 a). On the under side of the tegmina, a little behind the anterior margin and near the base (*Machærota* not examined) there is an elevated longitudinal keel (pl. ii. f. 3 and 4 c), which varies somewhat in height and shape. These structures on the anterior and posterior wings certainly stand in relation to one another and contribute to the steadiness of the latter in repose. As I have not met such a peculiar formation in any of the other families, this may afford a good family character.

In *Ledra aurita* the slightly convex anterior margins are strewn, on a space from the base to the retinaculum, with about twenty hooks of a similar structure to those in Cercopidæ, but I have not been able to find a trace of any keel on the tegmina. Similar arrangements of hooks may be found in other Jassid genera (in *Typhlocyba rosæ*, for example, I have observed them); but as a rule they occur neither in Jassinæ nor Membracinæ.

In the Fulgoridæ the anterior margin of the posterior wings generally presents the shape of a moderately flat arch; at the summit of the arch it is sometimes (*Pœciloptera phalænoides*) furnished with some sharp thorns, but the arch never assumes the triangular form characteristic of the Cercopidæ, and hooks are never found. On the under side of the tegmina one finds, a little from the base in relation to the convex part of the lower wings, a small triangular plate (f. ex. in *Fulgora* and *Pœciloptera*) standing out perpendicularly from the wings, which certainly has the same function as, though such a different form from, the longitudinal keel of the Cercopidæ.

In several forms, where the convex portion of the anterior margin of the posterior wings is very feebly marked (*Tettigometra*, *Aræopus*, and *Stenocarenus*), I have not been able to find the plates on the under side of the tegmina; nevertheless, in some instances (*Calyptoproctus stigma*, for ex.), the convex portion may be feeble and the tegminal plate extremely well developed. Though one cannot in this obtain family characters for the Fulgoridæ, it is probable that the above-mentioned differences will afford them for groups or subgroups.

In the Stridulantia no trace is found of the structures mentioned in the Fulgoridæ or Cercopidæ; the hind wings are held in position during rest by their feebly arched anterior margin resting for some distance close to the strongly salient thick costal area on the fore wings.

(To be continued.)

A NEW GENUS OF *COCCIDÆ*, INJURING THE ROOTS OF THE GRAPE-VINE IN SOUTH AFRICA.

By T. D. A. Cockerell, N.M. Agr. Exp. Sta.

Cryptinglisia, nov. gen.

A Lecaniine coccid having a glassy covering containing air-spaces, and retaining the legs and antennæ (7 or 8 joints) in the adult. Living in galls on the roots of *Vitis*. Differs from *Inglisia* in its mode of life; in the glassy scale not being divided, tortoise-like, into plates; and in the air-cells running together, forming long air-spaces. Larva ordinary, with six large bristles on the cephalic margin. Male unknown.

Cryptinglisia lounsburyi, n. sp.

♀. Adult about 2½ mm. long, soft, shiny, very dark brown, covered with a semitransparent, brittle, glassy scale. Skin transparent and colourless on boiling in KHO; mouth-parts moderate, rostral loop not very long; margin with a row of simple spines, brownish, about 24 μ long, placed close together; anal lobes ordinary, about 160 μ long, yellowish brown, surrounded basally by a large thick dark-brown chitinous plate, more or less semilunar in form, with the ends produced; a row of small round glands in the middle line from one end of the body to the other, but best developed posteriorly; antennæ and legs pale; legs ordinary, femur + trochanter about 120, tibia about 96, tarsus about 78, claw about 20 μ; claw-digitules about as long as claw, with large knobs; tarsal digitules long, with distinct knobs: antennæ 7 or 8 jointed, having three types, thus: (1.) 7-jointed with a short 3, all the joints subequal, 21 to 30 μ. (2.) 7-jointed with a long 3, which is about 41 μ long. (3.) 8-jointed, with 2 quite short, and 3 and 4 each about 30 μ long. The terminal joint is always short, 21 to 26 μ.

These insects occur underground on the roots of grape-vines, living in galls which are more or less globular, 4 to 5 mm. diameter, dark, rough and often nodulose on the outside, often aggregated together in numbers, or even coalescing, so that the root presents a nodulose thickening 6 or 7 mm. in diameter and over 20 mm. long. On breaking open the galls, which are quite hard, one finds a cavity containing the coccid. Small stones are frequently embedded in the sides of the galls.

Hab. Constantia, Cape Colony, at the roots of Stein and Reisling grapes (*Vitis vinifera*). Mr. Chas. P. Lounsbury, sending the specimens, says: "None were observed more than eight or nine inches from the surface, and all were on fibrous roots. As you will observe from the specimens, they are somewhat gregarious; ofttimes one or two rootlets will be quite covered, while all the others are free. Most of the infested vines were backward in growth,—some almost dead; but their condition is, I think, due to other causes than the attack of the insect. Some apparently healthy vines were noticed to be affected."

Mesilla Park, New Mexico: March 17th, 1900.

BRITISH DRAGONFLIES OF THE OLDER ENGLISH AUTHORS.

By W. J. Lucas, B.A., F.E.S.

(Continued from p. 75.)

3. *W. E. Leach: 'The Edinburgh Encyclopædia,'* conducted by D. Brewster, LL.D., vol. ix. pp. 136 and 137. 1815.*

In his article, "Entomology," in this work, W. E. Leach makes the first attempt to give some kind of a list of the British Dragonflies, as follows:—

Genus 479. LIBELLULA.
Sp. 1. **depressa** = *Libellula depressa.*
2. **conspurcata** = *Libellula fulva.*
3. **quadrimaculata** = *Libellula quadrimaculata.*
4. **cancellata** = *Orthetrum cancellatum.*
5. **vulgata** = *Sympetrum striolatum.*
6. **donovanni** = *Orthetrum cærulescens.*
7. **scotica** = *Sympetrum scoticum.*

Genus 480. CORDULIA.
Sp. 1. **ænea** = *Cordulia ænea.*

Genus 481. CORDULEGASTER.
Sp. 1. **annulatus** = *Cordulegaster annulatus.*

Genus 482. GOMPHUS.
Sp. 1. **vulgatissimus** = *Gomphus vulgatissimus.*

Genus 483. ÆSHNA.
Sp. 1. **grandis** = *Æschna grandis*, and no doubt other species.

Genus 484. ANAX.
Sp. 1. **imperator** = *Anax imperator*. This is the first reference to the species.

Genus 485. AGRION.
"Several indigenous species not accurately determined" (*Leach*).

Genus 486. LESTES.
"Three indigenous species" (*Leach*).

Genus 487. CALEPTERYX = CALOPTERYX. "Those Agrionida with coloured wings" (*Leach*).

4. *G. Samouelle: 'The Entomologist's Useful Compendium; or, An Introduction to the Knowledge of British Insects.'* 1819.

In this work the systematic portion was in a great measure due to W. E. Leach, who in each genus gives but one species, apparently as a type. They are as follow:—

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* A re-issue in 1830 was made use of for the compilation of this note.

Genus 380. Libellula.
  Sp. 1. **depressa** = *Libellula depressa.*
Genus 381. Cordulia.
  Sp. 1. **ænea** = *Cordulia ænea.*
Genus 382. Cordulegaster.
  Sp. 1. **annulatus** = *Cordulegaster annulatus.*
Genus 383. Gomphus.
  Sp. 1 **vulgatissimus** = *Gomphus vulgatissimus.*
Genus 384. Æshna.
  Sp. 1. **grandis** = *Æschna grandis.*
Genus 385. Anax.
  Sp. 1. **imperator** = *Anax imperator.*
Genus 386. Agrion.
  Sp. 1. **sanguineus** = *Pyrrhosoma nymphula.*
Genus 387. Lestes.
  Sp. 1. **autumnalis** = *Lestes sponsa.*
Genus 388. Calepteryx.
  Sp. 1. **virgo** = *Calopteryx virgo.*

As the species are not described, it is quite possible that Leach may have had before him other species of some of the genera, than those to which we have referred them, in the case of *grandis*, *sanguineus*, *autumnalis*, and *virgo*.

RECENT NOTES ON *HYDROMETRA MARTINI*, Kirk. = *LINEATA*, Say.

By G. W. Kirkaldy, F.E.S.

In the 'Canadian Entomologist' for March, 1900, an interesting "Study of *Hydrometra lineata*" (pp. 70–76) has been presented by Mr. J. O. Martin. Since nothing detailed has been related of the life-history and habits of this genus, I quote freely from Mr. Martin's paper, as the account he has given of the American species refers very probably in great part to our British species also.

"The insect hybernates in the adult stage, and during the first warm days of spring crawls stiffly out from under the rubbish along the banks, where it has passed the winter. When the weather becomes warm enough (the 1st to 10th of May at Ithaca), egg-laying begins; the female becomes restless, and stalks about in search of a place to deposit an egg. . . . Backing up to a grass-stem or almost any firm object which rises above the water, she exudes from the genital opening a drop of a gummy gelatinous substance, which she then presses against the object which has been chosen to support the egg. This sticky mass is the base of the egg-stalk, and, hardening very soon, fastens the egg in place before it has left the body." The egg—which is quite different in appearance from that of *Gerris*, or indeed any other Rhynchoton known to me—is long and spindle-shaped, about two millimeters long, that is to say, about one-half the length of the abdomen. The young nymph emerges seventeen days after oviposition, and is light green in colour. *Hydrometra lineata*, Say, is carnivorous, its food consisting of insects that fall into the water.* "When such a hapless insect falls into the water, it is at once pounced upon by one or several voracious Hydrometras, who insert their beaks and proceed to suck the juices from their still struggling victim. I have seen no less than ten thus surround their prey, all with their heads in the direction of common interest, and their bodies radiating outwards."

"The peculiar habitat of *Hydrometra*, combined with its elongate form, has given rise to a secondary sexual character, which occurs in both *H. lineata* and *H. stagnorum*. This consists of two notched projections on the inner side of the sixth abdominal segment, close to the incisure between the sixth and seventh segments. The object of these notched elevations of the abdominal walls is to fit over the lateral keels of the female abdomen, thus steadying the abdomen of the male during copulation." Some useful structural details of *H. lineata* and *H. stagnorum* are figured.

Some final remarks upon the genus have, however, to be slightly remedied. The "Siberian *Hydrometra*" *jankowskii*, Jakovlev, does not belong to the genus *Hydrometra*, Latr., but to *Hydrometra*, Fabr.—that is to say, to *Gerris*, Fabr., Latr.† The name "*lineata*," moreover, cannot stand, as it is preoccupied by *H. lineata*, Eschsch. (1822, Entomogr. p. 110), from Manilla [? = *vittata*, Stål, 1870], and I therefore rename Say's species after the entomologist who has first given some account of its habits:

HYDROMETRA MARTINI, Kirk., 1900
= *H. lineata*, Say, 1832 [*nec* Eschsch., 1822].

As Mr. Martin has omitted any mention of the species, it may be well to call attention again ‡ to the fact that *Hydrometra caraiba*, Guér., from the Antilles and Central America, is a true *Hydrometra*, and not a *Gerris* as catalogued by Lethierry and Severin.

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* See Entom., 1899, p. 112.

† *H. stagnorum* (Linn.) is also recorded from Siberia. See J. Sahlberg, 1878, Svensk. Akad. Handl. xvi. no. 4, p. 38.

‡ See Revue d'Entom., 1898, p. 73.

NOTES AND OBSERVATIONS.

The Pupal Habits of Cossus ligniperda.—In the autumn of 1896, the larvæ of *C. ligniperda* were very plentiful near Lewes, Sussex. I saw many full-fed examples crawling about much in the same way as *Phalæra bucephala* does; evidently, therefore, these larvæ did not remain in their larval quarters, but sought others for pupating. I placed one enormous larva in a small cage, where it soon established itself in a corner, gnawed a considerable hole in the hard deal, and spun its cocoon. It emerged in due time, and is now in my collection. The larva cage shows a deep hole where the wood was gnawed away.—F. M. A. MacKinnon; Binfield Lodge, Walton-on-Thames, April 24th.

Rhynchota Genera, &c.—I shall be greatly indebted to anyone possessing the following works who will furnish me with a list of the genera, &c., of Rhynchota contained therein: Hahn's Icon. Mon. Cimic. 1825 (?), and Fieber's paper in Weitenweber's Beyträge, 1836.—G. W. Kirkaldy; Wimbledon.

Oviposition of Gonopteryx rhamni.—This morning I have been watching a specimen of *Gonopteryx rhamni* while she was busily engaged in laying eggs on the young leaves of a shrub of buckthorn. Newman, I see, says "the eggs are laid singly," but this specimen on one occasion laid eight close together, though three seemed to be the favourite number; she also laid a few isolated ones. The plant on which she deposited them seemed to be the only buckthorn in the neighbourhood; every now and then she would leave it and flit up and down the lane, apparently in search of another bush, but each time she returned and renewed operations on the same plant. How many eggs she laid altogether I do not know, but the number must have been something very considerable.—D. P. Turner; Sutton, Surrey, May 5th, 1900.

Aberration of Vanessa urticæ.—I have in my cabinet an exactly similar aberration to the beautifully coloured figure of a specimen from Mr. Farn's collection, given in the 'Entomologist' for April last (pl. iii., fig. 1). My own insect was taken on the ceiling of a public-house at Midhurst, Hants, on July 12th, 1896.—Joseph Anderson; Chichester.

"Photo-Micrography for Entomology."—We have been favoured with a reprint of an article bearing the foregoing title. It is by Mr. F. N. Clark, and was originally published in the 'Annual of Microscopy' for 1899. A finely executed plate and two figures in the text, representing lepidopterous ova and structural details of insects, afford proof of the excellent results that can be obtained by a careful manipulator. The instructions are lucid and thoroughly practical. In his opening remarks Mr. Clark says:—"I am frequently at a loss to understand why photography is not utilized to a greater extent than at present in the illustration of works on natural history. This applies particularly to entomology, a subject that lends itself so admirably to the reproduction and enlargement of minute objects by aid of the camera. Some years ago, when photo-process work was in its infancy, the low standard of quality was no doubt responsible for a good deal of short-coming in this respect. This, however, can hardly be the case now that process-work has been brought to such a high state of perfection."

The Stevens Collection (concluded from p. 157).—Among the Heterocera, the lots that realized noteworthy prices were the following:—*Deilephila galii*. Five specimens bred from larvæ found at Deal, £1; three examples of the same species, with one *D. lineata*, taken at Lewes in 1849, 18s.; three *D. galii* and one *D. lineata*, the latter taken in 1847 at Hammersmith, £1. Four other examples of *D. lineata* ranged in price from 8s. to 16s. Three specimens of *D. euphorbiæ* made 10s., 16s., and 18s. respectively. *Chærocampa celerio*, of which there were eight specimens, ranged in price from 6s. to £1 4s.

One example of *Sesia andreniformis*, with two specimens of *S. sphegiformis* added as a kind of makeweight, fetched 12s. Of *S. tabaniformis* (*vespiformis*) there were four specimens; two of these sold for 7s., whilst the other couple went up to £1.

There was nothing very special among the Zygænidæ or, as some prefer to term them, the "Anthrocerides," but a lot of some thirty *Z. trifolii* and *Z. loniceræ*, including six or seven decent aberrations of the former species, realized £2 10s.; between 3s. and 4s. appeared to be the value of yellow varieties of *Z. filipendulæ*, of which there were five examples. Two lots of twenty-four Nolas, each with six examples of *N. centonalis*, including the white var., made £1 10s. the lot. Considering the species that were included in the two lots containing *Lithosia sericea*, the auction value of this species would seem to be about 3s. or 4s.

Nine specimens of *Deiopeia pulchella* were put up separately, and produced a total of £4 14s., or, roughly, half a guinea apiece. One example was dated 1848, one 1871, one 1873, four 1874, and one 1876.

A fine black aberration of *Callimorpha dominula*, bred in 1872, sold for £5 10s. Two nearly black varieties of *Nemeophila plantaginis*, together with a female with red hind wings, and two examples of var. *hospita*, fetched £4.

There were about thirty more or less interesting varieties of *Arctia caia*, and the best of these were disposed of at fairly good prices, ranging from 12s. to £4; the latter sum was given for a specimen somewhat similar to that figured in the 'Entomologist' last month, together with a dark variety. The best of the six or seven aberrations of *A. villica* sold for £4 10s.; this was a light variety with the spots on fore wings confluent, and the hind wings almost devoid of spots.

Lælia cœnosa was represented by ten perfect specimens, and these realized from £1 10s. to £2 per pair.

Lasiocampa ilicifolia made 2 guineas per pair, for two pairs, and a third pair was sold for £3.

One example of *Notodonta bicolor*, taken by Mr. P. Bouchard at Killarney in 1864, brought in £2 10s.

One example of *Bryophila algæ*, bought at the sale of the Burney Collection, together with some varieties of *B. glandifera*, including four specimens of the form known as *impar*, was cleared for 11s.

Of *Synia musculosa* there were three specimens, all from Brighton; one of these, with a Tiverton *Leucania vitellina* and some other things, only fetched 10s.—a fine specimen; and two *L. vitellina* from Tiverton brought £2; whilst the third example, with two *L. vitellina* from Freshwater, only realized 16s.

The price of *Tapinostola concolor* ranged at about 4s. per specimen; there were a dozen examples in the collection.

The ten specimens (6 male, 4 female) of *Noctua subrosea*, £37 9s., which gives an average of nearly £3 8s. each. The highest price given for a specimen was £4 15s., and the lowest £2.

Cerastis erythrocephala, of which four lots each comprising four examples were offered, realized from 16s. to £1 1s. per lot.

A specimen of *Xylina zinckenii*, taken in 1873, sold for 14s.; while another example, taken in 1865, went up to £1 10s.

Cucullia gnaphalii made £1 2s. and £1 8s. per couple; a fifth specimen, with six *C. absinthii*, produced £1 7s. 6d.

One example of *Thalpochares ostrina*, taken in 1873, realized £1 4s., and two specimens of *T. parva* were knocked down at 2s. less.

An example of *Ophiodes lunaris*, catalogued as taken near Ramsgate in 1874, fetched £1 8s.

No less than five specimens of *Catocala fraxini* were in the collection; one of these, taken in 1842, at Hammersmith, went for 13s.; another example, taken in Hants (1892), made 15s.; the others sold at from 6s. to 8s. each.

Five aberrations of *Venilia macularia*, including three specimens approaching var. *quadrimacularia* were bought for £1 15s.

The eleven specimens of *Cleora viduaria* yielded a total of over £8, and the ten examples of *Boletobia fuliginaria* cleared 6 guineas.

Of the varieties of *Abraxas grossulariata*, the most striking aberrations sold at from £1 15s. to £2 10s. each.

Fourteen specimens of *Phibalapteryx polygrammata* were put up in lots of four and five, and brought about 5s. per specimen.

Six of eight examples of *Cidaria reticulata* made 15s. each, and the others 6s. apiece; whilst a ninth specimen ("asymmetrical var."), with a suffused aberration of *C. prunata*, went up to £3 10s.

Three pairs of *Drepana sicula* (*harpagula*) sold at £1 12s. 6d., £1 15s., and £1 17s. 6d. per pair.

Description of certain Varieties of Peronea cristana.—Some varieties of *Peronea cristana* are described in the 'Annals and Magazine of Natural History' for 1842 (vol. x. p. 366); but, as this work is not readily accessible to many entomologists of the present day, I thought it might be worth while to transcribe the description of some interesting forms of this very variable moth which were written by "Capucina," alias the Rev. W. Johnson. The specimens referred to were captured in the New Forest in September, 1841:—

"The first I have named *Capucina*; the ground of the upper wings dark brown, with a shade of burnt umber, and an elevated white tuft or button in the centre of each wing; the head and palpi white; and the corslet and anterior part of the wings as far as the tuft nearly covered with an incrustation of pure white, with two blotches of the same, and several snow-white dots towards the extremity of the wings; the under wings shining pale brown, not unlike those of its congeners. The second is also a white button; the upper part of the upper wings a bright chestnut, besprinkled with a profusion of powdery white dust-like particles, the blending of the two colours producing a beautiful roan. I propose to call this insect *Gumpiana*; and, although I am not connected with the family of Gumps, the name is not without its charms, and therefore I hope it will not be unacceptable to the public. The third is so nearly allied to *ruficostana*, which is so well described by Mr. Curtis (*vide* 'British Entomology,' second edition, where all the species are described), that it is unnecessary to particularize respecting it; the shape of the wings and the colour throughout are precisely the same, with the addition of a well-formed red tuft or button on each of the upper wings; I have therefore ventured to name it *ruficristana*."

The beautiful *tolana*, *curtisana*, *subcapucina*, and a few others, are described by Mr. Desvignes in the third volume of the 'Zoologist,' p. 842.—C. W. Dale; Glanvilles Wootton.

South-Eastern Union of Scientific Societies.—The fifth annual Congress of the Union will be held at Brighton and Hove on June 7th, 8th, and 9th. An exhibition of photographs and apparatus will be given on Thursday afternoon at 3·30, and in the evening of the same day the Mayor of Brighton will receive members of the Congress at the Pavilion, and the President-Elect will deliver an address. On Friday papers will be read from 11 a.m. to 1 p.m., and from 3 to 5 p.m. Two of these are by Mr. F. Merrifield, and on entomological subjects. On Friday evening members are invited by the Mayor of Hove to a reception at the Hove Town Hall. Mr. F. Enock will lecture on "Wonders and Romance of Insect Life," with lantern illustrations. At 12 a.m. on Saturday there will be another illustrated lecture, and in the afternoon the museums and aquarium will be visited.

Members of a natural history or other scientific society in the South-East district, affiliated to the Union, are admitted to the Annual Congress, Excursions, &c., on payment of 2s. 6d. Associates—persons unattached to any affiliated society—are admitted to the same privileges on payment of 3s. 6d. Tickets or further particulars may be obtained by application to the local secretary, M. E. Alloway Pankhurst, 3, Clifton Road, Brighton.

Local Lists.—Hymenoptera of Nottinghamshire.—With the additional seventy-five species of Aculeates enumerated in this list—compiled by Rev. A. Thornley and J. W. Carr, and published in 'The Naturalist' for February last—the total number of Hymenoptera Aculeata recorded as occurring in the county is one hundred and thirty-seven, but thirteen of these are doubtfully included. Of Hymenoptera Tubulifera, five species of *Chrysis* and *Elampus auratus* are mentioned.

Diptera of Nottinghamshire.—In the Annual Report of the Nottingham Naturalists' Society for 1898–9, a list of Nottinghamshire Diptera is given by the Rev. A. Thornley. The number of species mentioned is two hundred and ninety, most of which were obtained by the compiler himself, and these chiefly at South Leverton. He is of opinion that the species referred to represent but a small portion of the Diptera occurring in the county. Some remarks by Mr. Percy H. Grimshaw are appended to the list. There are one or two other short papers dealing with entomology in the Report.

CAPTURES AND FIELD REPORTS.

Aromia moschata and Rhagium bifasciatum near Chester.—A specimen of *A. moschata* (the musk beetle) was taken by Mr. Thompson, of Chester, about the end of last July, off some nettles in the Sealand district. On Aug. 4th, when he and I were out together, he captured another in the same locality, resting on an old sallow. The first specimen, especially, gave out a strong musk scent, which clung to the cotton wool in the cyanide bottle for days after. Wallasey is the only other Cheshire locality I know for this handsome and interesting beetle, the larvæ of which burrow in old sallows.

Ten examples—two males and eight females—of *Rhagium bifasciatum* were taken by Messrs. Thompson and son, March 12th, this year, out of rotten alder-trunks near "the eleven arches," which carry the Birkenhead railway over the canal, about a couple of miles from Chester. Mr. Thompson, junr., and I, went to the spot on the 24th of the same month, but we only secured four—one male and three females. The trunks infested were well tunnelled—chiefly longitudinally—by larvæ of the species in all stages of growth, and the burrows contained, not only what looked like pupæ, but the living imagines we captured as well. The larvæ were white, with reddish jaws. The two well-defined oblique marks on each wing-case are certainly not "yellow," but pale grey. I found a screwdriver of great use in breaking up the rotten wood.—J. Arkle; Chester.

Ranatra linearis.—A well-grown, mature (that is, winged) specimen of this interesting water-bug was brought to me alive by Mr. E. Vincent, who took it from the canal near Byfleet on March 11th last, It is not a common insect in Britain, and is thought by some to be getting rarer, but it has been taken in this locality on two or three occasions, when search was being made for other things. It was also taken last year in one of the ponds in Bushey Park near Kingston-on-Thames. Its habitat is on the mud at the bottom.—W. J. Lucas; Kingston-on-Thames.

The following are three localities in which I have obtained *Ranatra linearis* this year:—Epping Forest, April 26th: found in all ponds, but commonest in the gravel-pit ponds near Loughton. Rickmansworth, May 2nd: two specimens only. Oxshott, May 19th: Black Pond, one specimen only. — S. K. Kemp; 80, Oxford Gardens, Notting Hill, W., May 20th, 1900.

Larvæ of Arctia caia and Odonestis potatoria at Chester.—These larvæ were unusually common on certain hedge-banks at the beginning of May.—J. Arkle; Chester.

Spring Captures—On Saturday, April 21st, about 3.30 p.m. (the sun shining brightly at the time), I saw a specimen of *M. stellatarum* actively engaged at clumps of white arabis in the garden. Is not this a very early and unusual occurrence? The same day I saw several specimens of *Vanessa urticæ* on the wing. I may also mention that, on March 9th and 10th respectively, I saw single freshly-emerged specimens of *Pieris rapæ*. —Thos. B. Blakeborough: Ashlea, Brighouse.

[Last year *M. stellatarum* was taken at Hereford on Jan. 3rd, and on Feb. 18th at Winchester. Both these captures are recorded in the 'Entomologist' for 1899 (vol. xxxii.), where also will be found reports of the occurrence of the species in many parts of the British Islands.—Ed.]

Vanessa polychloros.—On Feb. 24th of this year my brother found this butterfly hybernating in a tool-house in the garden. The capture is interesting, for since 1877–8, when the larvæ were abundant on the elms in front of the house—I counted forty on one small twig, which I cut off—not a single larva, pupa, or imago has been discovered, the insect having completely disappeared.—Joseph Anderson; Chichester.

Macroglossa stellatarum.—A specimen of this species was seen flying over flowers, by my friend Mrs. Fogden, in her garden at Apuldram, Chichester, on April 12th.—Joseph Anderson.

Notes from Chester and Delamere Forest—

March 10th.—Delamere Forest. A sunny day; south-west breeze. Warmer. A late season, and a great scarcity of insects. Took, or saw, six late male *Hybernia leucophæaria* on oak-trunks—all very unlike each other: also a male and female *Asphalia flavicornis.* The latter were pale grey forms, with, of course, the usual markings. Large numbers of oaks have now been cut down, the clearings being planted with larch and Scotch fir. I saw no *Phigalia pedaria* (*pilosaria*), *Nyssia hispidaria*, *Amphidasys strataria* (*prodromaria*), *Brephos parthenias*, *H. marginaria* (*progemmaria*), or *Anisopteryx æscularia.* Sallow catkins were just showing themselves—small, white, and silvery.

April 16th (Easter Monday).—Four of us went to Delamere Forest. Strong north-west gale all day. Sharp showers of rain after 10 a.m., but fair in the afternoon, although cloudy and sunny alternately, as well as colder. I took one *P. pilosaria* and one *A. strataria*, off oaks, after three hours of patient search. One of my friends, who was without the last named species in his collection, continued the search, as did all of us, for another couple of hours. Just when he had practically given the matter up, he found three fine specimens—two males and a female—all on the same oak—a most unusual find. Another couple of hours resulted in the capture of a fifth—average number per collector, one; total hours spent, seven. *Diurnea fagella* was fairly plentiful. Three reddish, hybernated Tortrix larvæ were got out of dead thistle-stems.

April 19th.—A burst of warm weather; sudden and complete change. The following were taken at sallow bloom in Delamere Forest:—*Panolis piniperda*, ten specimens, including pale grey and red varieties with intermediate forms—this species appeared to be very local, though plentiful where found—one place only; *Tæniocampa stabilis*, *T. instabilis* (from light to almost black forms), *T. pulverulenta* (*cruda*), *T. gothica*, *Pachnobia rubricosa*, *Cerastis vaccinii*, and *Larentia multistrigaria.*

April 28th.—Delamere Forest. At sallow the previous species repeated themselves. *P. piniperda* abundant, but only in the one spot. Specimens of *Tephrosia crepuscularia* were taken off oaks by day. Many hybernated larvæ, chiefly *Triphæna orbona*, were found, as night feeders, on the low sallows.

May 1st.—Night. Lane bordered with briar, bramble, sallow, &c., near Chester. *Anticlea badiata* was still on the wing, and a couple of *A. derivata* were netted. Other moths were *Cidaria suffumata*, and one each of *Selenia illunaria* and *Hypsipetes impluviata.* Larvæ were found on the sallows, the bloom on the bushes being all but over. A warm, still night.

May 4th.—The same lane; night. Rather strong south-west wind, with showers. Sky usually clear, with crescent moon. Altogether a bad night, and we took nothing but a few *T. orbona* larvæ, certainly not worth a walk of some six or eight miles.

The great matter of interest with me was how many of these species came to our electric lamps. Only three, as far as my observation went: *T. gothica*, *H. progemmaria*, and *S. illunaria*. This evidence may be useful in the future.—J. Arkle; Chester.

RECENT LITERATURE.

Malcolm Burr. *Essai sur les Eumastacides, tribu des Acridiodea*, 1899, Anal. Soc. Esp. Hist. Nat. xxviii. pp. 75–112 and 253–308 (sep. pag. 1–94), plates viii.–x. [Orthoptera.]

The Eumastacides (formerly "Mastacides") are a tribe of "short-horned Grasshoppers," remarkable for their bizarre forms and curious colours, displaying great superficial resemblance to certain other insects, viz. *Tipula*, *Mantispa*, *Sirex*, *Agrion*, &c. They are diagnosed by Mr. Burr as follows:—

"Statura minore vel mediocri; ungues tarsorum arolio instructi; antennæ brevissimæ, femoribus anticis breviores, genere unico Gomphomastace excepto, quo antennæ longiores, interdum corpore superantes, apice clavatæ; caput breve, ab antico compressum; prosternum muticum; corpus normale, haud inflatum, nec valde elongatum, tympano nullo primi segmenti abdominis."

They are divided into eight groups, embracing thirty genera (of which nine are new, viz.: *Bennia*, *Mastacides*,* *China*, *Eumastax* [n. n.], *Paramastax*, *Pseudothericles*, *Symbellia*, *Parathericles*, and *Phaulotypus*) and ninety-four species (of which twenty-eight are new).

The Eumastacides are confined to the warmer parts of the globe, and it is remarkable that no genus occurs in more than one of the principal "regions." The Oriental claims twelve genera, the Ethiopian eleven, the Neotropical five, Nearctic and Australian one each, while the Palearctic is not represented; the Oriental and Ethiopian regions therefore contain nearly seventy-seven per cent. of the total number of genera.

The Essay is evidently the product of laborious and practical research, and a thorough knowledge of the previous literature upon the group. The analytical tables of genera and species and the descriptions have been drawn up with great care, and are elucidated by the three plates of figures prepared by Mr. E. H. J. Shuster. It is to be hoped that in due course this at present indispensable revision will be superseded by a detailed monograph by the same author.

G. W. K.

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* Inadvertently ascribed, with its two species, to Bolivar, by Mr. Burr.

PAUL NOEL. *La Chasse aux Insectes aquatiques* (Journ. de l'Agriculture, 1897), 2 pp. and full-page illustration.

THE neighbourhood of electric light has been long a happy hunting ground for insects of all kinds, but we do not recollect having previously heard of the ingenious arrangement devised for the capture of aquatic forms by the enthusiastic director of the regional laboratory of agricultural entomology at Rouen.

A previously charged electrical accumulator (of the kind used for lighting bicycles, or some similar apparatus furnishing, say, twelve hours of light of about four candle-power at a time) is placed at the edge of the water which one wishes to work. It is sufficient simply to fix to the lamp attached to this accumulator two wires longer than those ordinarily provided with it—say, four metres—and carefully to cover over the juncture of lamp and wires with sealing-wax, to prevent leakage of the current.

As this little lamp does not sink in the water, it must be made fast to the centre of a semicircle of iron of about half a metre radius, to which is fastened, below the lamp, a large trap, constructed on the same principle as the bird traps which children make. On carefully lowering the trap into a not too weedy spot, the strong light attracts numerous insects and other animals; it can then be switched off, the trap closed and brought to the surface for the examination of its contents.

G. W. K.

Report of Injurious Insects and Common Farm Pests during the year 1899, with Methods of Prevention and Remedy. By ELEANOR A. ORMEROD. Pp. 152. London: Simpkin, Marshall & Co. 1900.

THIS is the twenty-third Report presented by Miss Ormerod, and No. 1 of the second series; the general index to the first series was published last year. Although larvæ of *Pieris brassicæ* appear to have caused some destruction here and there, and some trouble experienced with "wireworm" during the summer, the only insect pest that was mentioned as "seriously prevalent" was the turnip flea-beetle. *Ephestia kühniella* seems to have become more widely distributed in England and Scotland, and to have effected a lodgment in Ireland. *Dicranura vinula* is referred to, but is said not cause any great injury, except when its larva happens to attack young and tender trees, as, for instance, those in nursery plantations. *Cidaria dotata*, Newm. = *associata*, Bork., the larva of which feeds on the foliage of currant bushes, has been reported to Miss Ormerod as attacking red currant trees to a considerable extent. This moth is sometimes confused with *C. pyraliata*, Fb., which is generally considered to be the true *dotata*, Linn., the larva of which feeds on *Galium*. There are several illustrations in the text, and two plates; the figures in the latter represent a foot of *Hippobosca equina* and one of *Ornithomyia avicularia*, both highly magnified.

We may mention here that, in recognition of her many and valuable services to agriculturists and horticulturists, the Edinburgh University, on April 14th last, conferred upon Miss Ormerod the honour of LL.D.

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COLLECTIVE INQUIRY AS TO PROGRESSIVE MELANISM IN MOTHS.

The following "Memorandum from the Evolution Committee of the Royal Society" has been recently issued:—

1. The Committee appointed by the Council of the Royal Society to promote investigation of facts relating to Variation, Heredity, Selection, and other phenomena connected with Evolution are desirous of instituting a collective investigation into the progressive melanism of certain moths, particularly Geometridæ.

2. It is well known that in certain districts, especially within the British area, dark forms of several species of moths have recently appeared and become increasingly abundant. There is reason to believe that these dark forms are in some cases extending into other districts and even to the European Continent.

3. It is to be regretted that no systematic or statistical records of these phenomena have been kept, and it appears to the Committee that if such a record be now instituted and continued for a period of years it cannot fail to have considerable scientific importance.

4. The matter is one that may conveniently be made the subject of collective investigation, and the Committee will be glad to hear from any entomologist who may be willing to contribute now, or hereafter, particulars as to the condition of these species in the district or districts with which he is personally familiar. The returns should relate as far as possible to specimens *found in a wild state*, whether as imagines, or pupæ, larvæ, or eggs. Information respecting specimens bred from wild parents must be kept distinct.

5. It is thought desirable that the enquiry should for the present be confined to the following species:—*Acidalia aversata*, *Amphidasys betularia*, *Boarmia repandata*, *Camptogramma bilineata*,

Gnophos obscurata, Hemerophila abruptaria, Hybernia progemmaria, Phigalia pilosaria, Acronycta psi, Agrotis corticea, Aplecta nebulosa, Polia chi, Venusia cambrica, Xylophasia polyodon.

6. The Schedule in which it is suggested that the returns should be made is enclosed (Schedule A). It is desired that the return for each species be made on a separate Schedule, and the Secretary will be glad to furnish a supply of these schedules to any one who may be willing to assist.

7. Since confirmatory evidence is of especial value, the Committee are desirous of receiving returns made independently by different persons for the same district. It is of course hoped that returns may be obtained for districts in which the dark forms are still unknown.

8. The Secretary will be glad to examine and prepare descriptions of any illustrative specimens lent to him for that purpose, and in suitable cases arrangements will be made for photographing such specimens.

9. Historical Evidence. As the changes in question have largely taken place within living memory, it is hoped that those who have personal knowledge of the facts may be induced to put them on record in such detail as is still possible. Much information of an historical character is of course already printed in the scientific journals, but a more detailed account of the facts would be of great value. With this object a special Schedule (B) marked "Historical" will be issued to those who will fill it up.

10. On publication full acknowledgment will be made of all help received. All communications should be addressed to the Secretary of the Evolution Committee, W. Bateson, Esq., F.R.S., Merton House, Grantchester, Cambridge.

May, 1900.

"ENTOMOLOGY IN NEW ZEALAND."

By G. V. Hudson, F.E.S.

Under the above somewhat comprehensive title Mr. Ambrose Quail has (*ante*, p. 5) really given the readers of your valuable magazine a criticism of my recently published book on New Zealand Macro-Lepidoptera. To call an essay, however learned, which deals with only a portion of one of the orders of the great class Insecta, a paper on "entomology" is, to my mind, somewhat misleading, and I think that it would have been more straightforward and accurate on Mr. Quail's part had he openly named his article as a criticism on my book. This would also have given me a better chance of replying to his strictures.

The opening passages in Mr. Quail's paper do not, I think, tend to show that he is specially qualified to criticise even such inferior work as he would wish to represent my book to be. He states that he has only been in New Zealand three years, and that the localities at which he has been stationed have not been favourable to the pursuit of entomology; also "that there is little or no literary work at least get-at-able." Subsequently he ascertained, I may remark, through the aid of local naturalists, myself included, that some entomological work had been done in New Zealand, and forthwith he proceeds on this basis to demonstrate the defective nature of the work done by his predecessors.

Mr. Quail alleges that I am unacquainted with the work of certain lepidopterists for whose methods he apparently entertains a certain amount of respect, but in his criticism of the system of classification followed in my book he is simply condemning the system of Meyrick, with which he does not appear to be fully acquainted himself. This system, it may be pointed out, is being largely followed by the British Museum authorities in their great work on the Heterocera of the world, so that apparently I am not singular in placing a certain amount of dependence on the work of the "one man" he alludes to. I expressly explained my reasons for following Meyrick in my introduction thus:—"Although adopting Mr. Meyrick's system in the present work, I do not agree unreservedly with all his conclusions; but I have not attempted to alter his system in accordance with my own views, as I conceive that the conclusions of a naturalist who has only had the opportunity of studying a restricted fauna would necessarily be liable to considerable error." This passage, I think, disclaims any individual responsibility on my part.

I shall not occupy your valuable space with detailed remarks on all the points raised by Mr. Quail in regard to my work, but trust I may be permitted to refer to one or two as examples of the class of criticism to which I have been subjected in the article under review.

Mr. Quail states that he captured one specimen of *S. convolvuli* in Auckland in February, 1897. From an examination of this single specimen he concludes that my figure of the insect is incorrect. Again, Mr. Quail remarks that my figures of the Caradrinina (Noctuidæ, &c.) are poor. He can have had but very little experience in the figuring of species belonging to this very obscurely marked group not to know that, whilst it is possible to obtain faithful and striking representations of the sharply and brightly marked species belonging to other groups, many species of the Caradrinina baffle all attempts at description or delineation. This point is specially referred to on page 15 of my book, where I describe the difficulties encountered in discriminating between the species of the genus *Melanchra*, as well as the doubtful nature of many of the species included in that genus.

It is gratifying to find that Mr. Quail approves of my treatment of the butterflies, and even goes so far as to quote from my account of my transformations of *Vanessa gonerilla*. These remarks will no doubt be read with amusement by those of your readers who perused my paper on the metamorphosis of this butterfly in the 'Entomologist' for October, 1883, written from the very town where my critic now resides.

Mr. Quail protests against "commencing a book with specialized groups (most recent), and finishing with the most generalized groups (most ancient)." This protest really refers to Mr. Meyrick's system, and I have explained, as already stated, my reasons for following that system. In connection with the genus *Porina*, Mr. Quail again asserts that my figures are bad, because they do not exactly agree with the specimens he has in his possession. Here again we have to deal with obscurely marked and variable species which offer great difficulties in the way of representation, and this fact explains why Mr. Quail finds the figures of the Porinas bad, whilst those of the brightly coloured and conspicuous *Hepialus virescens* he pronounces as "excellent." I have never given any "hint as to the time occupied in the transformations of *H. virescens*," simply because I have never had a specimen under observation from the egg state to the imago. In fact, when Mr. Quail has become more intimately acquainted with this insect he will find that the duration of its larva life is probably considerably longer than two years—probably longer, in fact, than Mr. Quail's residence in New Zealand. As the insect inhabits the stem of a growing tree, the exact duration of its transformation could only be ascertained by completely isolating several of the trees which had not been attacked by the larva, and inducing a fertile female moth to deposit her eggs in the enclosure. It would then be necessary to observe the larvæ in the trees until their final transformation. This would be a most difficult and extensive experiment, but one of considerable interest, and I trust Mr. Quail will undertake it, and succeed in carrying it out to a successful termination.

Mr. Quail's description of the tubercles of the larva of *Hepialus virescens* is no doubt extremely learned and exact, but I hardly think that it would be suited to most of those who are likely to employ my book in New Zealand. There is so much work to be done here, and so few workers to do it, that these extreme niceties of description might well be left to our successors. The fauna is rapidly changing, and in many localities it is vanishing at an alarming rate from a naturalist's point of view; so that field workers are what we urgently require in New Zealand, who will collect specimens and observe facts before the opportunities for doing so disappear for ever.

Although adverse to personal controversy in scientific matters, I cannot help directing attention to one of Mr. Quail's concluding remarks. After stating that the number of segments of a larva should be stated as fourteen and not thirteen, as described by Meyrick and many other authors, he quotes from my description of the larva of *H. virescens*, thus:—"The head is large, dark brown, very irregularly striated, and covered with a few short bristles. The first segment is hard and shining, meaning thereby the first thoracic, otherwise the prothorax, or, consistently, the second segment. Errors in colour may be the lithographer's, but errors in letterpress must be the author's, and by a man's writings so we must judge his capacity as a student." Of course, strictly speaking, I should have referred to the segment in question as the second segment; but in reading the entire clause the segment indicated is clearly that immediately following the head, and I do not think that there could be any misunderstanding on that point. To dwell on slight figures of speech in this way shows, to my mind, a spirit of ungenerous criticism, and not merely a laudable desire for scientific accuracy.

Karori, Wellington, New Zealand: March 30th, 1900.

ON A SMALL COLLECTION OF INSECTS, CHIEFLY LEPIDOPTERA, FROM NICARAGUA.

By A. G. Butler, Ph.D.

A small consignment of insects in envelopes was recently forwarded to the Museum by Señor M. Deoclesians Chaves, of Managua, who was anxious to obtain their names; it included several species of value to the Museum, notably *Myscelia pattenia*, sexes of *Papilio panares*, Cr.; but, as might be expected in the case of a Central American collection, nothing new to science was received. The following is a list of the species:—

Nymphalidæ.

Lymnainæ.

1. *Tasitia eresimus* (♂), Cramer.
2. *Lycorea atergatis*, Doubleday and Hewitson (worn).

Ithomiinæ

3. *Dircenna euchytma*, Felder.
4. *Hymenitis oto*, Hewitson.

Morphinæ.

5. *Morpho hyacinthus*, Butler. This may perhaps be a variety of *M. montezuma*; it is characterized by the dark, acutely zigzag discal line, bounded on both sides by a pale stripe on

under surface of primaries, and the more or less green suffusion of the under surface.

6. *Caligo prometheus*, Kollar.

Heliconinæ.

7. *Heliconius charitonia* Godart.
8. *H. zuleika*, Hewitson.
9. *H. petiverana*, Doubleday.
10. *Eueides dynastes*, Felder.

Nymphalinæ.

11. *Smyrna blomfildia* (♂, ♀), Fabricius.
12. *Gynæcia dirce* (♂), Boisduval.
13. *Lipoeta epaphrus*, Latreille.
14. *Protogonius cecrops*, Doubleday.
15. *Zaretes isidora* (♀) var., Cramer.
16. *Dione vanillæ*, Linnæus.
17. *D. juno*, Cramer.
18. *Chlosyne hyperia*, Fabricius.
19. *C. melanarge*, Bates. This seems not a common species; at any rate we previously possessed only one example.
20. *C. saundersi* var., Boisduval.
21. *Anartia iatrophæ*, Linnæus.
22. *A. fatima*, Fabricius.
23. *Phyciodes ptolyca*, Bates.
24. *P. theona*, Ménétriés.
25. *Microtia elva*, Bates.
26. *Myscelia pattenia*, Butler and Druce. This species was new to our collection; the type collected by Van Patten is in the Godman and Salvin Collection.
27. *Victorina steneles*, Linnæus.
28. *Timetes chiron*, Fabricius.
29. *Callicore pitheas*, Latreille.
30. *Eubagis mylitta*, Cramer.
31. *Adelpha iphicla*, Linnæus.
32. *Chlorippe laure*, Drury.
33. *C. callianira*, Ménétriés. This also was new to our collection.
34. *Ageroeonia glauconome*, Bates.
35. *Peridromia guatemalena*, Bates.
36. *Didonis aganissa*, Boisduval.
37. *Precis genoveva*, Cramer.

Erycinidæ.

38. *Mesosemia lamachus*, Hewitson.
39. *Charis argyrodines*, Bates.
40. *Lymnas pixe*, Boisduval.
41. *L. cephise*, Ménétriés.

LYCÆNIDÆ.

42. *Cycnus aufidena*, Hewitson. I have not yet carefully studied the characters of the genus *Cycnus*, which may prove to be only a group of *Panthiades* or some other Thecline genus. I use the name tentatively, *Thecla* being absolutely untenable for the tropical American forms.

PAPILIONIDÆ.

43. *Papilio belesis*, Bates.
44. *P. thymbræus*, Boisduval.
45. *P. numitor*, Cramer.
46. *P. alcamedes*, Felder.
47. *P. panares* (♂, ♀), G. R. Gray.
48. *P. epidaus*, Boisduval.
49. *P. thoas*, Linnæus.
50. *Pyrisitia proterpia*, Fabricius.
51. *Sphænogona boisduvaliana*, Felder.
52. *Amynthia clorinde*, Godart.
53. *Meganostoma cesonia*, Stoll.
54. *Callidryas philea* (♂, ♀), Linnæus.
55. *C. sennæ* (♂), Linnæus.
56. *Phœbis argante* (♂), Fabricius. This will probably prove to be the dry form of *P. cipris*, Cramer.
57. *Kricogonia lyside* (♂), Godart.
58. *Pieris calydonia* (♂), Boisduval.
59. *P. phileta* var. *feronia* (♂), Stephens.
60. *P. josepha* (♂), Godman and Salvin.
61. *Glutophrissa ilaire* var. *neumœgenii*, Skinner.

HESPERIIDÆ.

62. *Mysoria venezuelæ*, Scudder.
63. *Camptopleura thrasybulus*, Fabricius.
64. *Calpodes nyctelius*, Latreille.

CASTNIIDÆ.

65. *Castnia futilis*, Walker.

HYPSIDÆ.

66. *Phaloesia saucia*, Walker.

NEUROPTERA.

Only one species was sent, represented by one tolerably perfect and one shattered example, viz. *Mecistogaster ornatus*, Rambur.

I have to thank my colleague, Mr. F. A. Heron, for assistance in naming the butterflies, which saved me considerable time.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Concluded from p. 155.)

B. politella, *Dougl.*—Belfast, two (*W.*).

B. mundella, *Dougl.*—Sandhills of Dublin coast; Sligo (*R.*).

B. affinis, *Dougl.*—Sligo (*R.*).

B. umbrosella, *Zell.*—Sandhills of Dublin coast; Sligo (*R.*).

B. domestica, *Haw.*—Wicklow Mts.; Magilligan, Derry (*Curzon*).

Lita artemisiella, *Tr.*—Dublin coast sandhills; Newcastle, Co. Down, abundant (*W.*); Sligo (*R.*).

L. maculella, *St.*—Howth.

L. tricolorella. *Haw.*—Howth.

L. fraternella, *Dougl.*—Howth and Malahide; Co. Dublin.

L. leucomelanella, *Zell.*—Among *Silene maritima* on the cliffs of Howth; Magilligan, Co. Derry (*Curzon*).

L. marmorea, *Haw.*—Abundant on the coast sandhills, Bundoran (*W.*); Derry (*C.*); Letterfrack, Co. Galway.

L. instabilella, *Dougl.*—Howth; Sligo (*R.*).

L. plantaginella, *Sta.*—Howth; Sligo (*R.*).

Teleia proximella, *Hub.*—Galway; Belfast.

T. humeralis *Zell.*—Wicklow Mts.; Belfast.

T. vulgella, *Hb.*—Belfast (*W.*).

T. dodecella, *L.*—Belfast (*W.*).

T. triparella, *Zell.*—Killarney.

Recurvaria leucatella, *Clerck.*—Clonbrock; Galway (*R.E.D.*).

Argyritis tarquiniella, *Sta.*—Sandhills at Howth. This species, or probably variety of *A. pictella*, has also been taken in Scotland, on the coast, and among ordinary *A. pictella*, in Suffolk. It hides among the short herbage, and under the edges of the sandhills. It was described as a species distinct from *A. pictella*, by the late Mr. H. T. Stainton, from Irish examples; and its history is not yet fully worked out.

Nannodia stipella, *Hb.*—Howth.

Lamprotes atrella, *Haw.*—Dingle, Co. Kerry.

Anacampsis tæniolella, *Tr.*—Dublin coast; Blarney, Co. Cork.

A. anthyllidella, *Hb.*—Dublin coast, common; Sligo (*R.*).

Tachyptilia populella, *Clerck.*—Killarney.

T. temerella, *Zell.*—Sligo (*R.*).

BRACHYCROSSATA CINERELLA, *Clerck.*—Sligo (*R.*); Howth; Wicklow Mts. (*B.*); Limerick (*Talbot*).

PARASIA METZNERIELLA, *Sta.*—Sligo (*R.*).

P. CARLINELLA, *Dougl.*—Sligo (*R.*).

CLEODORA CYTISELLA, *Curt.*—Killarney.

CHELARIA HÜBNERELLA, *Don.*—Killarney; Belfast (*W.*).

ANARSIA SPARTIELLA, *Schr.*—Howth.

PLEUROTA BICOSTELLA, *Clerck.*—Sligo (*R.*); Belfast hills, locally abundant (*W.*); Castlehaven, Co. Cork; Killarney; Markree Castle, Co. Sligo; Toberdaly, King's Co.; and Cloghan, Co. Donegal (*K.*).

HARPELLA GEOFFRELLA, (*L.*).—Killarney; Sligo (*R.*).

DASYCERA SULPHURELLA, *Fb.*—Common everywhere.

ŒCOPHORA MINUTELLA, (*L.*).—Dublin, Howth, Galway.

Œ. FULVIGUTTELLA, *Zell.*—Dublin (*Hogan*).

Œ. LAMBDELLA, *Don.*—Killarney.

Œ. FUSCESCENS, *Haw.*—Howth.

Œ. PSEUDOSPRETELLA, *Sta.*—Universally abundant.

ŒCOGENIA QUADRIPUNCTATA, *Haw.*—Howth.

ENDROSIS FENESTRELLA, *Scop.*—Universally abundant.

BUTALIS GRANDIPENNIS, *Haw.*—Howth.

B. FUSCOÆNEA, *Haw.*—Killarney.

GLYPHIPTERYGIDÆ.

ACROLEPIA GRANITELLA, *Tr.*—Dublin and Howth; Cappagh, Co. Waterford (*K.*).

GLYPHIPTERYX THRASONELLA, *Scop.*—Common everywhere; Belfast (*W.*); Clonbrock, Co. Galway (*R. E. D.*); Sligo (*R.*), &c. Var. *cladiella*, Sta.—Sligo (*R.*).

G. HAWORTHANA, *St.*—Wicklow Mts.

G. EQUITELLA, *Scop.*—Island Magee, Co. Down, very abundant (*W.*).

G. FISHERIELLA, *Zell.*—Howth; Belfast, abundant (*W.*); Sligo (*R.*).

ARGYRESTHIIDÆ.

ARGYRESTHIA EPHIPPELLA, *Fb.*—Belfast, scarce.

A. NITIDELLA, *Fb.*—Generally common; Belfast (*W.*); Derry (*C.*); Sligo (*R.*), &c.

A. SEMITESTACELLA, *Curt.*—Belfast (*W.*); Armagh (*J.*).

A. ALBISTRIA, *Haw.*—Wicklow Mts.; Belfast (*W.*); Sligo (*R.*).

A. CONJUGELLA, *Zell.*—Belfast, abundant (*W.*); Sligo (*R.*).

A. MENDICA, *Haw.*—Belfast, abundant (*W.*); Sligo (*R.*).

A. RETINELLA, *Zell.*—Killarney; Westport, Mayo (*W.*); Enniskillen (*P.*).

A. CURVELLA, *L.*—Sligo (*R.*).

A. PYGMÆELLA, *Hb.*—Belfast (*W.*); Enniskillen (*P.*).

A. GŒDARTELLA, *L.*—Dublin; Wicklow Mts.; Belfast, abundant (*W.*); Sligo (*R.*).

A. BROCHELLA, *Hb.*—Dublin; Wicklow Mts.; Belfast, abundant (*W.*); Sligo (*R.*); Enniskillen (*P.*).

A. ARCEUTHINA, *Zell.*—Sligo (*R.*).

OCNEROSTOMA PINIARIELLA, *Zell.*—Howth.

ZELLERIA PHILLYRELLA, *Mill.*—One example of this species, hitherto not recorded as British, was captured at Renvyle, near Letterfrack, Connemara, by the Rev. C. T. Cruttwell. A notice appeared in the issue of the 'Entomological Monthly Magazine' of January, 1900, p. 4, by Mr. Barrett, who identified it. Although two or three hardy species of *Phillyrea* are not uncommonly cultivated in shrubberies, the grounds at Renvyle were laid out a great many years ago on the sea-shore facing the Atlantic, and are isolated by many miles of wild country from any similar habitation. The insect must presumably have been introduced with the food-plant, if it feeds only on species of *Phillyrea;* and it would be interesting to investigate the circumstances of its naturalisation, and whether it is plentiful.

GRACILARIIDÆ.

GRACILARIA ALCHIMIELLA, *Scop.*—Generally common; Sligo; Cromlyn, Co. Westmeath, &c.

G. STIGMATELLA, *Fb.*—Belfast (*W.*).

G. ELONGELLA, *L.*—Of general occurrence near Ballincar, Sligo. A very singular yellow form was taken by Mr. Russ at Union Wood.

G. TRINGIPENNELLA, *Zell.*—Dublin; Howth; Galway; Island Magee, Co. Down, abundant (*W.*); Sligo (*R.*).

G. SYRINGELLA, *Fb.*—Dublin, Belfast, abundant (*W.*); Derry (*C.*); Sligo (*R.*); Clonbrock, Co. Galway (*R. E. D.*).

G. PHASIANIPENNELLA, *Hb.*—Howth.

G. AUROGUTTELLA, *St.*—Howth, and Wicklow Mts.

CORISCIUM BRONGNIARTELLUM, *Fb.*—Bray, Co. Wicklow (see notice by W. F. Kirby, Entom. Oct. 1874, p. 117); also on the southern coast (*K.*).

C. CUCULIPENNELLUM, *Hb.*—Sligo (*R.*).

C. SULPHURELLUM, *Haw.*—Sligo (*R.*); and Clonbrock, Co. Galway (*R. E. D.*).

ORNIX ANGLICELLA, *Sta.*—Dublin and Howth; Armagh (*J.*); Belfast (*W.*).

O. BETULÆ, *Sta.*—Belfast (*W.*).

O. SCOTICELLA, *Sta.*—Enniskillen (*P.*).

O. GUTTEA, *Haw.*—Sligo (*R.*).

COLEOPHORIDÆ.

COLEOPHORA FABRICIELLA, *Vill.*—Sligo (*R.*).

C. DEAURATELLA, *Lien.*—Sligo (*R.*); Enniskillen (*P.*).

C. ALCYONIPENNELLA, *Kol.*—Howth; Sligo (*R.*).

(C. VIBICELLA, *Hb.*—Six specimens of this species—from the collection of Mr. Russ, labelled "Sligo," identified by Mr. Barrett—are in the Dublin Museum of Natural History. As, however, the insect is not known to feed upon any plant except *Genista tinctoria*, which is not indigenous in Ireland, it seems advisable to defer the inclusion of *C. vibicella* in the Irish list until further information is available as to its habits.)

C. ALBICOSTA, *Haw.*—Howth and Galway; Sligo (*R.*).

C. ANATIPENNELLA, *Hb.*—Howth and Galway; Sligo (*R.*).

C. DISCORDELLA, *Zell.*—Howth and Galway; Enniskillen (*P.*); Sligo (*R.*).

C. CÆSPITITIELLA, *Zell.*—Abundant everywhere.

C. LARIPENNELLA, *Zett.*—Howth; Sligo (*R.*).

C. ARTEMISICOLELLA, *Brd.*—Howth.

C. APICELLA, *Sta.*—Sligo (*R.*).

C. ARGENTULA, *Zell.*—Sligo (*R.*).

C. VIRGAUREELLA, *Sta.*—Howth.

C. LARICELLA, *Hb.*—Enniskillen (*P.*).

C. NIGRICELLA, *St.*—Dublin; Derry (*C.*); Westport (*W.*).

C. FUSCEDINELLA, *Zell.*—Dublin; Enniskillen (*P.*).

C. GRYPHIPENNELLA, *Bouché.*—Enniskillen (*P.*) and Howth.

C. VITISELLA, *Greg.*—Wicklow Mts.

C. VIMINETELLA, *Heyd.*—Enniskillen (*P.*).

C. OLIVACEELLA, *Sta.*—Howth.

ELACHISTIDÆ.

BATRACHEDRA PRÆANGUSTA, *Haw.*—Dublin, abundant; Wicklow Mts.

ŒNOPHILA V-FLAVA, *Haw.*—Dublin, among fungi in spirit vaults.

CHAULIODUS CHÆROPHYLLELLUS, *Göze.*—Howth; Wicklow Mts.; Belfast (*W.*).

LAVERNA EPILOBIELLA, *Schr.*—Dublin.

L. SUBBISTRIELLA, *Haw.*—Clonbrock, Co. Galway (*R. E. D.*).

L. HELLERELLA, *Dup.*—Dublin, abundant.

L. ATRA, *Haw.*—Belfast, abundant (*W.*).

Chrysoclysta linneella, *Clerck.*—Holywood, Co. Down.

C. schrankella, *Hb.*—Enniskillen (*P.*).

C. aurifrontella, *Hb.*—Howth, and near Dublin; Armagh (*J.*).

Asychna modestella, *Dup.*—Dublin.

Chrysocoris festaliella, *Hb.*—Howth; Killarney; Belfast (*W.*); Derry (*C.*); Sligo (*R.*).

Elachista atricomella, *Sta.*—Sligo (*R.*).

E. luticomella, *Zell.*—Howth; Coolmore, Donegal (*J.*).

E. flavicomella, *Sta.*—Howth. Originally described from two examples, taken here by Mr. R. Shield in July, 1855. Again taken in same place by Mr. J Sang in 1883. Almost unknown otherwise.

E. kilmunella, *Sta.*—Sligo (*R.*).

E. monticola, *Wk.*—Ballinahinch, Co. Down (*W.*).

E. nigrella, *Hb.*—Generally common.

E. subnigrella, *Dougl.*—Howth.

E. perplexella, *Sta.*—Dublin; Belfast (*W.*).

E. bedellella, *Sircom.*—Armagh (*J.*); Sligo (*R.*).

E. obscurella, *Sta.*—Belfast (*W.*).

E. zonariella, *Tgstr.*—Howth.

E. tæniatella, *Sta.*—Howth.

E. megerlella, *Zell.*—Howth.

E. rhynchosporella, *Sta.*—Sligo (*R.*); Belfast (*W.*); Enniskillen (*P.*).

E. dispunctella, *Dup.*—Howth.

E. pollinariella, *Zell.*—Howth.

E. rufocinerea, *Haw.*—Dublin; Wicklow Mts.; Sligo (*R.*); Belfast (*W.*); Armagh (*J.*).

E. subalbidella, *Schl.*—Belfast, abundant (*W.*).

E. argentella, *Clerck.*—Of general occurrence.

Tischeria complanella, *Hb.*—Belfast.

T. marginea, *Haw.*—Howth.

Lithocolletidæ.

Lithocolletis irradiella, *Scott.*—Raheny, near Dublin.

L. bremiella, *Zell.*—Wicklow Mts.

L. pomifoliella, *Zell.*—Generally common.

L. coryli, *Nicelli.*—Malahide; Belfast (*W.*).

L. spinicolella, *Kol.*—Dublin.

L. faginella, *Mann.*—Dublin; Clonbrock, Co. Galway (*R. E. D.*).

L. salicicolella, *Sircom.*—Howth; Enniskillen (*P.*); Belfast (*W.*).

L. ULMIFOLIELLA, *Hb.*—Howth; Enniskillen (*P.*).

L. QUERCIFOLIELLA, *Fisch.*—Abundant everywhere.

L. MESSANIELLA, *Zell.*—Dublin; Howth; Holywood, Co. Down.

L. CORYLIFOLIELLA, *Haw.*—Dublin; Howth; Wicklow Mts.

L. ALNIFOLIELLA, *Hb.*—Howth; Belfast (*W.*); Enniskillen (*P*).

L. HEEGERIELLA, *Zell.*—Wicklow Mts.

L. CRAMERELLA, *Fb.*—Generally common.

L. NICELLII, *Zell.*—Enniskillen (*P.*).

L. SCHREBERELLA, *Fb.*—Clontarf, near Dublin.

L. TRIFASCIELLA, *Haw.*—Howth.

LYONETIIDÆ.

LYONETIA CLERCKELLA, *L.*—Donnycarney, near Glasnevin, Dublin; Holywood, Co. Down; Blarney, Co. Cork.

CEMIOSTOMA SPARTIFOLIELLA, *Hb.*—Generally common.

OPOSTEGA CREPUSCULELLA, *Fisch.*—Sligo (*R.*); Enniskillen (*P.*).

BUCCULATRIX NIGRICOMELLA, *Zell.*—Sligo (*R.*).

B. CRATÆGIFOLIELLA, *Dup.*—Howth.

B. MARITIMA, *Sta.*—Howth.

NEPTICULIDÆ.

NEPTICULA ANOMALELLA, *Göze.*—Howth.

N. OXYACANTHELLA, *Sta.*—Howth, and Coolock, Co. Dublin.

N. SEPTEMBRELLA, *Sta.*—Howth.

N. IGNOBILELLA, *Sta.*—Howth and Coolock, Co. Dublin.

N. ARGENTIPEDELLA, *Zell.*—Howth.

N. ACETOSÆ, *Sta.*—Howth; Bray, Co. Dublin (*S.*).

N. PLAGICOLELLA, *Sta.*—Artane and Donnycarney, near Glasnevin, Dublin.

N. GRATIOSELLA, *Sta.*—Killester, Co. Dublin.

N. MARGINICOLELLA, *Sta.*—Clontarf, Co. Dublin.

N. AURELLA, *Fb.*—Of general occurrence.

MR. DONOVAN'S CAPTURES IN CO. CORK.

By W. F. DE VISMES KANE, M.A., F.E.S., &c.

THE list of moths captured by Mr. R. J. F. Donovan at Timoleague and its neighbourhood (*ante*, p. 103) is a contribution of much value to the student of geographical distribution; and it shows that this gentleman is a worthy successor of his brother, who, when resident at Glandore, did most excellent work in the same direction, and added not a little to our knowledge of the lepidopterous fauna of a portion of Ireland hitherto neglected by tourists or naturalists, if we except marine zoology. Neither of these two stations, however, offers equal attractions in point of its fauna when compared with the Killarney district, which presents such varied features of forest, moor, and mountain in a state of nature—unaltered almost by the hand of man. And, indeed, in this respect, no part of Great Britain can compete with this part of Kerry, except the New Forest and portions of Scotland.

But the climate of the South of Ireland admits the survival of many insects which could not endure the severe conditions of the Scottish highlands. The mild and equal temperature of Killarney, however, is shared both by Glandore and Timoleague; and thus we find evidence of the existence of many species from these portions of Co. Cork which are peculiar to the warmer districts of these islands. It is interesting to find a well-marked zone in the southern half of Ireland, but stretching further north on the western coast, which is washed by the Gulf Stream, in which alone are found certain species. Many of these are included in Mr. Donovan's list, which the temperature, without reference to any physical features of the country, confines almost exclusively to these parts of Ireland. Among these may be instanced *Vanessa io*, *Epinephele tithonus*, *Thecla quercus*, *Gnophria quadra*, *Mamestra persicariæ* (which scarcely ever occurs in the North of Ireland), and perhaps *Agrotis corticea; Amphipyra pyramidea*, *Tæniocampa pulverulenta*, *Hecatera serena*, *Chariclea umbra*, *Venilia macularia*, *Amphidasys strataria*, *Eupithecia plumbeolata*, and *E. debiliata*. There are other species, besides those in Mr. Donovan's list, which are similarly restricted, such as *Bombyx neustria*, *Heliothis peltigera*, and apparently *Dianthœcia cæsia*, the distribution of which, in regard to isothermal lines, elsewhere in the British Islands, would well repay investigation. I exclude also the three remarkable species which he has captured at Timoleague, namely, *Leucania extranea*, *Laphygma exigua*, and *Sterrha sacraria*, since two of them have only once before been recorded; while *L. exigua* is unique from Ireland. I regret that Mr. Donovan has included doubtfully *Acidalia trigeminata* in his list, on my authority. I have seen no Irish specimens of this moth. Probably they may be *A. bisetata* var. *fimbriolata*, which has been more than once sent me as *trigeminata*. The larvæ found at the roots of bog cotton, and attributed to *Tapinostola fulva*, may very well have been those of *Celæna haworthii*, which are internal feeders in the roots of species of *Eriophorum*. It is to be hoped that other rarities may reward Mr. Donovan's perseverance.

LYCÆNA PHERETES AND ITS ALLIES IN THE SIKHIM HIMALAYAS.

By W. Harcourt-Bath.

In that very creditable and painstaking work, 'The Butterflies of India, Burmah, and Ceylon,' the author, Mr. Lionel de Nicéville, describes as distinct species *Lycæna lehana*, Moore, from Ladak, and *L. pheretes*, Hübner, from Sikhim. Subsequently, however, in the 'Gazetteer of Sikhim,' he unites them under the former, and explains that "the Himalayan form of *L. pheretes* may be distinct from the European and Central Asian form, but the Ladak and Sikhim forms are practically identical."

During my journey through Sikhim in 1897 I encountered three distinct forms of, or three species closely allied to, *Lycæna pheretes*:—

No. 1.—The first, which I found near Yeumtung at the altitude of 12,000 to 13,000 ft., is apparently the species given as *Lycæna pheretes*, Hübner, var. *asiatica*, Elwes, in the 'Butterflies of India, &c.' In expanse it measures just about the same as the form found in the Swiss Alps, namely, 1·1 in.; but, as pointed out by Mr. de Nicéville, it differs from the latter in the "narrower and pointed fore wings, and in having much more gloss on the under side." To this I may add that in the Sikhim form the blue is more brilliant, and the shape of the white spots on the under side of the hind wings is slightly different. The female is pale brown on the upper side.

No. 2.—This form, which I propose to call *Lycæna sikhima*, was taken about 1000 ft. higher up than the preceding, in the upper limits of the pine forests, and appears to be sufficiently distinct from the preceding, although aberrations were found somewhat intermediate between the two. In size it is very much inferior to No. 1, measuring under an inch in expanse, with much narrower and very pointed wings; but the principal distinction is in the colour, which gives it a very different appearance, being of the same tint of lilac as British specimens of *Cyaniris argiolus*. The female is very similar in colour to that of No. 1. I have not seen *Lycæna lehana* from Ladak, but, judging from the description of it in Mr. de Nicéville's work, it somewhat resembles this. He briefly describes it as follows:—"Expanse, ·9 to 1 in. Male upper side violet-blue, brownish blue at the margins. Differs from *L. pheretes* in their much smaller size." This agrees with the Sikhim form as regards size, but not in the colour of the margins of the wings. As far as I can judge, without seeing specimens of the Ladak form, the latter appears to be somewhat intermediate between Sikhim form No. 2 and the one I am about to describe.

No. 3.—This form is totally distinct from either of the other two taken in Sikhim, although it is much closer to No. 2. In expanse, and in the narrow pointed shape of the wings, it agrees with the latter very closely, but the colour of the upper side of all the wings is totally different.

The following is a description of form No. 3:—Expanse, ·8 to ·9 in. Male, slaty grey-brown, powdered with pale blue scales, more especially at the base of the wings, with a pale blue discoidal spot on the fore wings, and frequently on the posterior pair; all the margins brown, but rayed with pale blue, more distinctly in some specimens than in others. In most of the examples the white spots of the under side show through on both the anterior and posterior wings, but are occasionally indistinct on the latter pair. The female differs from the male in being browner, and of a less slaty grey colour, with fewer blue scales at the bases, but the discoidal spots rather more distinctly marked. The under side in both sexes is very similar to those of Nos. 1 and 2, but the marginal border of pale brown spots is much more distinctly defined.

The peculiar greyish brown colour, with the blue rays and discoidal spots, give this butterfly altogether a very curious and distinctive appearance, totally different to either of the other two forms described, and no forms whatever connecting them were found; so that it appears to be quite distinct, and, in my opinion, deserves to rank as a species. It occurs at the highest altitude of any of the Lycænidæ in the Sikhim Himalayas, having been found by myself between the heights of 15,000 and 18,000 ft. on the extreme upper limits of phanerogamic vegetation. At the former altitude it was very plentiful in July at Momay Samdung, flying among the numerous alpine flowers which flourished in that region; many specimens were also taken at rest on a species of purple aster. From thence right up to within 500 ft. of the summit of the Donkia Pass it was found sparingly in company with two species of *Parnassius*, two of *Argynnis*, one of *Colias*, and one of *Œneis*. To this interesting little butterfly I should like to give the name *Lycæna altissima*.

Longfleet, Dorsetshire: May 30th, 1900.

NOTES AND OBSERVATIONS.

Macrocephalus arizonicus = uhleri.—When describing *Macrocephalus arizonicus* (Entom. xxxiii. p. 66), I unfortunately overlooked the description of *M. uhleri*, Handl. Verh. Ges. Wien, 1898, p. 383. I have not now seen that description; but Mr. Ashmead, at my request, has been so kind as to compare it with my type of *arizonicus*, which is now in the U. S. National Museum. He writes me that "it agrees exactly in every point, and unquestionably is identical."—T. D. A. Cockerell; Mesilla Park, N.M., April 28th, 1900.

Eggs of Ceroplastes irregularis (Entom. xxvi. p. 351).—On January 16th, 1900, females of this species, with eggs, were found at Mesilla Park, N.M. The eggs from a single female were counted by my entomology class, and were found to number 1181.—T. D. A. Cockerell.

Diplosis partheniicola, n. sp.—♀. Length about 2½ mm. Dorsum of thorax shiny, black, slightly hairy; sides of prothorax brown; scutellum prominent, with four bristles directed backwards; eyes meeting on vertex; abdomen raspberry colour, blackish dorsally; ovipositor long, blackish, the narrow terminal segment light reddish-ochreous; legs very pale, ochreous-tinted; antennæ very pale, 2 + 12-jointed, joints cylindrical, a little constricted in the middle, short-pedicelled; halteres pale orange. Emerged March 26th, 1900, from galls on *Parthenium incanum*, collected at the foot of Picacho Mountain, Mesilla Valley, New Mexico. Larva orange. Pupa-shell colourless, with the anterior end dark sepia-brown. Galls at the bases of the leaves, about 5 mm. diameter, woolly and snow-white, like little tufts of cotton-wool.—T. D. A. Cockerell.

Ischnura pumilio.—I am glad to be able to report that this dragonfly, which disputes with *Agrion mercuriale* the distinction of being the smallest on the British list, has turned up again, its haunts having been lost sight of for some fifty years perhaps. A short time since, a friend brought me a box of dragonflies for identification, and amongst them were two or three specimens of *Ischnura pumilio*, which I understand were taken in Norfolk last year. Strange to say, during a short stay in the New Forest at Whitsuntide of this year, I took seven specimens of the same species, five males and two females, both of var. *aurantiaca*. The insect appears to come on the wing at the end of May or beginning of June, and, judging from the fact that I have often hunted the New Forest locality at the very beginning of August, it must be over by that date. Possibly streams through peat-bogs would be good localities to search for the species, which should be well out by the end of the present month.—W. J. Lucas; June 14th, 1900.

Heliothis armigera.—As in other zoological regions where this species occurs, its appearance in New Zealand is also erratic. The present has been an *armigera* year on the Canterbury Plains, South Island, where the moths have been plentiful during the last two months. They appear to be much attracted by the flowers of *Araujia albens*, by which they are trapped and perish daily in fine weather. I possess some fine large plants of this Brazilian "moth trap," which have bloomed profusely each autumn for six years, but the present is the first season in which I have observed *H. armigera* caught by the flowers. Noctuæ have been somewhat scarce at the flowers this summer in this district. In former years I have generally obtained numbers of perfect specimens of several species every morning, caught in the flowers the previous night. I find that great care is necessary in cutting open the flowers to liberate the captives' antennæ, in order to secure good specimens. I would surmise that vast numbers of insects must perish annually at these flowers in Brazil, where the plant is indigenous, and where insects are perhaps more numerous than in any other zoological region.—W. W. Smith; Ashburton, N. Z., May 2nd, 1900.

Nonodonta chaonia.—In 1897, I picked out of the River Stour a half-drowned female *N. chaonia*, which deposited several eggs. These hatched, and I bred a long series in 1898. Some of the larvæ when full-fed were put in an ordinary breeding cage, in which I last year put other pupæ. When looking at these on the 10th, I found a freshly emerged female *chaonia*, which had therefore been three years in the pupal state, as I have not had any larvæ since 1897.—A. Druitt; Christchurch, May 15th, 1900.

Erratum.—P. 157, line 4 from bottom, for "boxes" read "bones."

CAPTURES AND FIELD REPORTS.

Lycæna argiolus.—Whilst staying at Carmarthenshire this week I observed a female of *L. argiolus* depositing ova on the needles or shoots of the gorse or furze (*Ulex europæus*). I do not remember having seen this recorded as one of its food-plants.—T. B. Jefferys; Bath, June 2nd.

Thecla w-album Larvæ abundant.—Mr. P. Richards tells me that he has found larvæ of *Thecla w-album* exceedingly common on a single wych-elm between Esher and Ripley, in Surrey. All or most of those that he secured have by this time pupated, and if other wych-elms are equally favoured, there should be an abundance of imagines of this butterfly shortly. —W. J. Lucas; 12, Caversham Road, Kingston-on-Thames, June 14th.

New Forest.—Three days' collecting at Easter with Mr. A. D. Wilson produced fair results, considering the very cold wind. From the sallows we obtained a great number of *Panolis piniperda*, which, with *Tæniocampa stabilis*, were far the commonest moths. There were also a few *Tæniocampa miniosa*, *T. gothica*, and *Orrhodia vaccinii*. During the day *Amphidasys prodromaria*, *Xylocampa lithoriza*, and *Tephrosia biundularia* were taken off trunks and fences. — H. Wells; Hurstfield, The Avenue, Gipsy Hill, London, S.E., May 23rd, 1900.

Assembling.—On the 17th inst. I took a freshly emerged *Smerinthus tiliæ* female sitting on the fence, and placed her in the assembling cage, hanging it on the lower branches of a lime tree, with the following results: 17th, three males; 18th, seven males; 19th, four males; 20th, three males; 21st, very wet, none; 22nd, two males; 23rd, two males. A net result of twenty-one males by the agency of one female is, I think, somewhat of a record even for this district, in which *S. tiliæ* is fairly plentiful. A striking peculiarity is also noticeable in the circumstance. We have assembled some dozens of this species, and on no occasion has the male arrived before 9 o'clock, nor have we ever been able to see one after 9.30.—William A. Carter; Burr Villas, Bexley Heath, Kent, June 6th, 1900.

Plusia gamma abundant.—On June 12th, just before a thunderstorm, I observed at this place a large number of *P. gamma* flitting about everywhere—hundreds of them. The previous evening I was at the same spot, and did not see a single specimen. Although they are still abundant, there is nothing like the same number as on the 12th. I thought the above of interest, as I did not see half a dozen specimens of *P. gamma* here all last season.—J. W. Woolhouse; Summer Hill, Fakenham, Norfolk.

Lycæna argiolus.—This species has been common about the holly-bushes in gardens on Blackheath during the last three weeks. — Walter Dannatt; Donnington, Vanbrugh Park, Blackheath, May 28th, 1900.

Where Tæniocampa gracilis lays its Eggs.—During the night of May 7th, whilst searching with a lamp for larvæ near Chester, I found a female *T. gracilis* laying her eggs on a dead last year's flowerhead of *Centaurea nigra*. I see from my note-book I had a similar experience, in the same lane, which is well fringed with briars, brambles, and sallows, on the night of May 12th, 1899, only, in this case, the moth had chosen a dead grass-head. The larvæ feed on several plants—notably the trusses of unopened meadow-sweet flowers (Entom. xxxii. p. 126). The eggs of *T. opima* I have found on dead ragwort, thistle, and dwarf rose (Entom. xxiii. p. 307). —J. Arkle; Chester. [Ova of *T. gracilis* are very frequently found on dead seed-heads, &c., of various low growing plants.—Ed.]

Easter (1900) in the New Forest.—In spite of the bad weather preceding the holiday, my father and I found ourselves installed in our old quarters in the forest, at Bank, on April 12th. During the drive along the beautiful road from Brockenhurst, it was only too plain on every hand how backward is the season. The blackthorn, which a fortnight earlier last year was in full flower, was now only in bud, though a few bushes came into bloom during our stay. Several of the whitethorn bushes showed no green at all; many of the sallows, we were told, had only come out during the last week; a suspicion of redness gave the sole indication of the oaks beginning to bud, but birch and beech looked very beautiful, the former pale yellow green with catkins and young leaves, the red buds of the latter all ready to burst.

The first night at the sallows was scarcely reassuring. It was fearfully windy, and there was also a little rain. Insects refused to settle down, and were very restive. There were a few each of *Tæniocampa stabilis* and *Cerastis vaccinii*, one very fine *Pachnobia rubricosa*, and one *Eupithecia abbreviata*—a wretched night! Added to our other discomforts, the lantern, which had apparently not recovered from its long hybernation, refused to remain alight, so we turned in early. After this the weather became fairly fine as a whole, but about as adverse to collecting as it could be. When the day was otherwise bright and sunny there would be a terrific wind, and when there was no wind down would come the rain. At night, however, wind and clouds almost invariably disappeared, and a brilliant moon shone on the unfortunate collector. The total result of four whole days' collecting was fourteen *Xylocampa lithorhiza*, one *Tephrosia crepuscularia*, one *Pieris rapæ* (freshly emerged) two *Vanessa polychloros*, which was in great numbers on the Saturday; about twenty larvæ of *Sesia cynipiformis* (*asiliformis*) from oak stumps, a few larvæ (small) of *Agrotis* *agathina* (?) from heath, and two each of *Cleora lichenaria* and *Hemithea thymiaria*. *Gonepteryx rhamni* was fairly abundant. Such insects as *Brephos parthenias*, *Lobophora lobulata*, &c., which one would naturally expect to find, did not put in an appearance at all. On pulling some bark off an old dead oak-tree, several *Rhagium inquisitor* and *R. bifasciatum* were exposed.

Sallows, though by no means good, were better than day-work. After the first night *Tæniocampa stabilis* was extremely common, outnumbering *Cerastis vaccinii*, the next in numbers, by about ten to one. Of *Tæniocampa miniosa*, which I did not take last year, I secured nine, mostly perfect specimens. *T. munda*, as in 1899, was represented by a solitary example. *T. cruda* was scarce, and in bad condition, apparently over. *T. gothica* very fine, and fairly common. We obtained also two perfect *Pachnobia rubricosa*, half a dozen *Panolis piniperda* (another collector whom we met took forty-two in one night), a few *Xylocampa lithorhiza* and *Eupithecia abbreviata*, and single specimens of *Hybernia marginaria* and *Anticlea badiata*. Two examples of *Scopelosoma satellitia* were also noticed, and one *Xylophasia lithoxylea* (surely a very unusual insect—I did not know it hybernated). Larvæ beaten at night were *Cleora lichenaria*, *Rumia luteolata*, *Triphæna fimbria*, and *T. pronuba* (? or *orbona*).

I should be glad if any one could tell me whether *Tæniocampa incerta* (*instabilis*) is at all local, as I have not come across a single specimen in the New Forest, either this year or last. We returned home on Tuesday, and the following day the weather immediately became almost perfect.—F. M. B. Carr; 46, Handen Road, Lee, S.E.

SOCIETIES.

Entomological Society of London.—*May 2nd*, 1900.—Mr. W. L. Distant, Vice-President, in the chair. Mr. A. A. Dalglish, of 21, Prince's Street, Glasgow, was elected a Fellow of the Society. Mr. W. L. Distant exhibited the cocoon, measuring nearly three and a half inches each way, of a Coprid beetle—probably belonging to the genus *Heliocopris*—found at Pretoria, in the Transvaal. The Rev. Theodore Wood exhibited a specimen of *Carabus auratus*, L., taken in either June or September, 1898, by Mr. Ferrand, of Littlefield House, Exmouth, on the Haldon Hills, in the neighbourhood of that town. Mr. McLachlan exhibited an example of *Rhinocyphea fulgidipennis*, Guérin, a brilliant little dragonfly of the subfamily Calopteryginæ, a native of Cochin China, which, so far as he knew, had not been captured since prior to 1830. It had been in M. Guérin's hands, and Mr. McLachlan had received it from M. René Oberthür. Dr. T. A. Chapman exhibited various specimens illustrating *Acanthopsyche opacella*; fresh females showing the six nearly complete rings of silky wool with which she is clothed; specimens preserved *in cop.*, showing the exact position of the male moth in the female case, and the position of the two moths in relation to the female pupa-case. It was incidentally mentioned that the inflation of the male abdomen with air was observed to be the main force employed in advancing the male abdomen into position, and that observation of the immature wing threw considerable light on the real neuration in this species. Mr.

Barrett exhibited specimens of Heterocera destructive to the fruit crops of South Africa. Among them *Sphingomorpha monteironis*, Butl., known as the Fruit Moth in Cape Colony—a bold and powerful insect, with a sucking tongue strong enough to pierce the sound skin of a peach or fig. The presence of a light does not appear to disturb it, so that examination of its methods can be readily made, when it can be seen that it does not take advantage of the natural opening into a fig, or of a crack or other injury to a peach, but deliberately pierces a hole which afterwards shows as a small round spot, from which decay invariably results. It seems a matter of indifference to the moth whether the fruit has fallen, or is on the tree, ripe or unripe. With regard to *Achæa lienardi* and *Serrodes inara*, the two species are restless and timid, and therefore more difficult to observe. In the present season, however, both have been extremely abundant, and have been seen at apparently uninjured fruit, so that it seems they are capable of equal destruction, and this is the more probable as all the species alike are provided with somewhat saw-like teeth toward the tip of each section of the sucking apparatus. Several others, feeding mainly on damaged fruit, were also taken with the aforesaid species, among them several new to science, and recently described by Sir George Hampson. They included *Pseudophia tirrhæa*, Cr., *Ophiusa melicerta*, Drury, *O. mormoides*, Walker, *Ophiusa griseimargo*, Hampson, *O. selenaris*, Hampson, *Dysgona faber*, Holt, *Ericeia unangulata*, Gn., *Homoptera glaucinans*, Gn., *H. edusina*, *Pandesma umbrina*, *P. fugitiva*, *Trigonodes obstans*, *Audea ochripennis*, *Dordura tegulata*, Hampson, *D. retracta*, Hampson, *Hybocala deflorata*, *Deva natalensis*, *Oresia argyrosigma* and var. *provocans*, *O. emarginata*, *Agrotis segetum*, *A. munda*, *A. spinifera*, *A. amatura*, *A. decipiens*, *A. rimosa*, *Noctua atrosignata*, *Axylia interstriata*, Hampson, *Gonites sabulifera*, *Cosmophila erosa* and var. *xanthyndyna*, *Leucania interciliata*, Hampson, *L. albovitta*, Hampson, *L. monosticta*, Hampson, *L. rhabdophora*, Hampson, *L. tacuna*, Feld., *L. amens*, *L. torrentium*, *L. loryi*, *Laphygma exigua*, *L. orbicularis*, and *Eulaphygma abyssinia*. Mr. Jacoby exhibited *Callomorpha wahlbergi* from Africa, and *Spilopyra sumptuosa* from Australia. A paper was communicated on "New Palæarctic Pyralidæ," by Sir George F. Hampson, Bart.—C. J. GAHAN & H. ROWLAND BROWN, *Hon. Secs.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*April* 12*th*, 1900.—Mr. F. Noad Clark in the chair. Mr. G. B. Browne, 43, Southbrook Road, Lee, was elected a member. Mr. Edwards exhibited a living specimen of *Scorpio europæus*, sent by Dr. Chapman from Cannes; it fed readily upon cockroaches. Mr. Sich, living larvæ and cases of *Coleophora lineola*, from Chiswick. Mr. Clark, photomicrographs of the ova of (1) *Eugŏnia fuscantaria*, showing clearly the serrated edges; (2) *Geometra vernaria*, in piles as deposited; and (3) *Neuronia popularis*. Mr. Colthrup, specimens of *Bombyx quercus* var. *callunæ*. Mr. Tutt gave an interesting account of the Lasiocampid Moths, to which he had recently been devoting his attention. He showed that they formed a clearly definable section, and contained numerous easily distinguishable, although closely allied, subsections and genera. The various points of view of ovum, larva, pupa, and imago were taken into consideration, and contrasted and compared with allied groups, as well as *inter se*.

April 26*th*.—Mr. W. J. Lucas, B.A., F.E.S., President, in the chair. Mr. Rowden, of Kingston Hill, was elected a member. Mr. Buckstone exhibited specimens of *Triphæna fimbria*, bred from ova; the larvæ had been fed exclusively on cabbage. Mr. Turner, Longicorn Coleoptera: (1) *Saperda populnea*, taken by Mr. Day at Carlisle; (2) *Rhagium bifasciatum*, from the New Forest; (3) *Clytus mysticus*, from Brockley; (4) *C. arietis*, from Lewisham; together with larvæ of (1) *Callimorpha dominula*, from Deal, where they were comparatively scarce; (2) *Bombyx quercus*, from Deal, on garden rose; (3) *Pericallia syringaria*, from Bexley. Mr. Moore, a Kaffir necklace made of ants' "eggs"; these so-called eggs are really the encysted pupæ of a species of Coccid, of subterranean habits, belonging to the genus *Margarodes*. Mr. Lucas, a specimen of the dragonfly, *Sympetrum vulgatum*, a male, taken by Mr. Hamm, of Oxford, at Torquay on Aug. 15th, 1899; this is the second authenticated British specimen. Mr. Adkin, a fine bred series of *Eugonia fuscantaria*, from Lewes ova, and stated it was easy to breed when sleeved. Mr. Clark reported that he had received ova of *Gonepteryx rhamni* which had been found deposited on the stems of the buckthorn. Mr. Harrison reported having seen a dragonfly, *Libellula quadrimaculata*, on the wing at Easter.

May 10*th*.—The President in the chair. Mr. Adkin exhibited a series of *Cabera exanthemaria*, showing variation in the relative positions of the transverse lines.

May 24*th*.—The President in the chair. Mr. Clark exhibited a sawfly cocoon of a most delicate fibrous structure. Mr. Enock gave a series of interesting notes, illustrated with admirable lantern-slides, on various incidents in insect life, including (1) a long series of slides showing all stages in the closing of the wings in the earwig; (2) a series showing the gradual unfolding and growth of the wings in *Papilio machaon;* and (3) all stages in the emergence and hardening process of *Æschna cyanea*.

RECENT LITERATURE.

KUHLGATZ. *Eine neue Plataspidinen-Gattung aus Deutsch Ost-Afrika mit geweihartiger Verlängerung der Juga beim Männchen sowie über einige der nächsten Verwandten dieser neuen Gattung* (S. B. Ges. Naturf. Freunde, Berlin, 1900, pp. 120-135, figs. 1-3). [Rhynchota.]

Herr Theodor Kuhlgatz describes an extraordinary Coptosomatine (Cimicidæ), closely allied to *Plataspis*, from German East Africa, which he terms *Elapheozygum goetzei*, gen. et sp. n. In the male the juga (the lateral portions of the dorsal part of the head) are enormously elongate, being much longer than the thorax and abdomen together; each jugum is forked near the apex. Such an appearance is common enough among Coleoptera, but in Rhynchota very rare. The female is normal in structure, though an abnormal specimen of this sex is figured, in which the left jugum is distinctly longer than the right; this the author considers may perhaps be an hermaphrodite. The paper concludes with an analytical table of the eleven genera of the *Plataspis* group.—G. W. K.

C. M. Weed. *The Spiny Elm Caterpillar* (New Hampshire Coll. Agric. Exp. Sta. 1899, Bull. 67, pp. 123–141, 16 figs.).

This Bulletin will be of interest to British lepidopterists as embodying information about the habits, in America, of a butterfly only too rare with us. *Euvanessa antiopa* (commonly known in America as the "Mourning Cloak") is extremely injurious in some of the eastern States to the foliage of elm trees—photographs of this damage are presented to the reader—but feeds also on willow, poplar, and, rarely, on hackberry (*Celtis occidentalis*), birch, pear, and rose.

Like some other of its allies, it has a wide distribution, ranging over "the entire breadth of the northern hemisphere, below the arctic circle as far south as the thirtieth parallel of latitude," that is, from Canada to Bermuda and Mexico, Europe, Japan, &c.

The damage done to elms and poplars, though only occasional and limited in area, is sometimes very great, Prof. Lugger observing that they were so numerous upon elms in Michigan "that branches were broken by their weight."

The Bulletin concludes with a notice of the parasites and enemies of the insect, and remedies against its devastations.—G. W. K.

Anton Handlirsch. *Wie vielen Stigmen haben die Rhynchoten?* (Verh. Zool. Bot. Ges. Wien, 1899, sep. p. 1–12, figs. 1 & 2).

After briefly reviewing the work of Dufour, Mayer, Schiôdte, Hansen, and others, and discussing the position and structure of the stigmata in various Rhynchota, the author sums up his researches as follows.

The fundamental type in Rhynchota is—two pairs of thoracic stigmata (meso- and metathoracic) and eight pairs of abdominal stigmata (segments 1–8). This type embraces the whole of the Homoptera, except the more or less degraded Psyllidæ, Aphidæ (? Aleurodidæ), and Coccidæ, in which a more or less considerable progressive reduction (from behind forwards) of the abdominal stigmata occurs, which reaches its maximum in the Coccidæ. In waterbugs an inconsiderable modification, taking in account the necessary adaptation to special conditions of existence, takes place, which is increased in the landbugs, in which there is a tendency to atrophy of the first pair of abdominal stigmata. Only the absolutely wingless group of Pediculidæ, strongly modified by their eminently parasitic manner of life, deviate considerably from the original type, the first two pairs of abdominal stigmata and those of the metathorax having vanished.

We find, also, an astonishing antithesis between the plant parasites and the animal parasites, of which the former are obviously derived from the Homoptera, the latter probably from the Heteroptera, if indeed they belong to the Rhynchota at all.

We regret that the Direction of these *Verhandlungen* still find it convenient to issue the author's copies with a separate pagination, thereby creating two references for the same work, with no concomitant compensating advantage. As the separate copy only is before us, we are unable to indicate the correct pagination.—G. W. K.

Proceedings of the South London Entomological and Natural History Society for 1899. Pp. 120, with one plate. Published at the Society's Rooms, Hibernia Chambers, London Bridge. 1900.

Although something like three-fourths of its income is needed to defray rental charges and general working expenses, this Society always seems able to publish its volume of Proceedings. The balance-sheet shows us that a sum of £44 was paid during the financial year for printing. We further glean from the same document that donations to the Publication Fund amounted to £26, and that £20 was transferred thereto from the General Fund.

In his address the retiring president (Mr. A. Harrison), after briefly referring to the affairs of the Society, and reviewing the work of the season, discourses at some length on the subjects of Telegony, and the connection of the mosquito with malarial fever. There are five papers, and one of these, by Dr. Chapman, entitled "Some Points on the Evolution of the Lepidopterous Antenna," is of special importance. Mr. J. W. Tutt's paper treats of the "Nature of Metamorphosis." Mr. Malcolm Burr contributes an instructive paper on Orthoptera, in which he gives an outline of the literature on the subject in chronological order, and makes some helpful remarks on species of the order, specially referring to those occurring in Britain. Mr. Robert Adkin furnishes another of those interesting accounts of his entomological observations while on holiday at Eastbourne. Although not strictly entomological, we must not omit to mention a brief but useful paper by Mr. D. J. Scourfield on "Fresh-water Entomostraca."

A good deal of valuable information will be found in the "Abstract of Proceedings."

We heartily congratulate the Society on the production of this excellent volume.

OBITUARY.

Mr. William Watkins died at his residence, Villa Sphinx, Eastbourne, on June 9th last, aged fifty-one years. We have very little knowledge of his early career, except that he had a passion for collecting butterflies when quite a boy. When he arrived at the age of manhood he went to India, where for six years he acted as Orderly-room Clerk to the 76th Regiment, and devoted a good deal of his leisure time to the capture of Lepidoptera. On his return to England he sold his collection to Mr. Horniman, and subsequently decided to adopt entomology as a business. He was originally connected with the well-known entomological firm in the Strand; subsequently he carried on business in Piccadilly, and finally he removed to Eastbourne. In 1881 he established and conducted the arrangements of the Insect-house at the Gardens of the Zoological Society, and a year or two later he opened a similar concern at the Crystal Palace. From time to time Mr. Watkins held exhibitions in various parts of the country. On one occasion, when at Newmarket, he was honoured by a visit from the Prince of Wales and the Duke of Cambridge.

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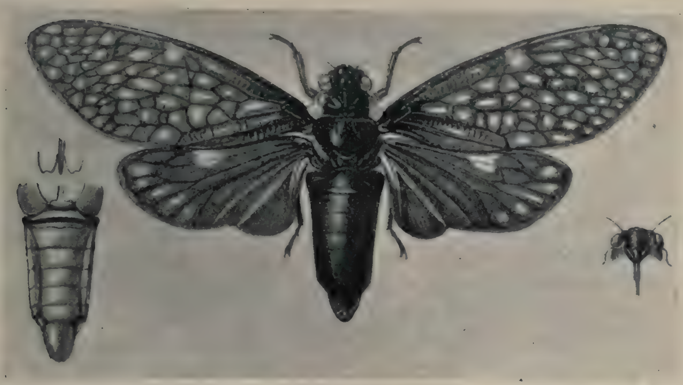
DESCRIPTION OF A NEW SPECIES OF CICADIDÆ FROM CHINA.

By W. L. Distant.



Talainga chinensis, sp. n.

♂. Body and legs black; eyes ochraceous, their posterior margins sanguineous; pronotum, with the lateral margins and a spot on lateral areas behind the eyes sanguineous. Tegmina black, opaque, with a pale creamy-white spot in almost all of the many cell-like areas, the most prominent spot being subcostal, and situate at the apex of the radial area. Wings black, with a large creamy-white spot extending across and a little below the radial area at about two-thirds from its base; five small submarginal creamy-white spots situate in the apical areas, and some basal streaks and some of the longitudinal venation margined with the same colour. Long. excl. tegm. ♂, 30 millim. Exp. tegm. 83 millim.

Hab. China: Kualun, N. W. Fokien (Coll. by Tang-wang-

wang and Tang-chung-how; and presented by J. de la Touche, Esq., to the British Museum).

This is the second representative of the genus, which I described in 1890 from a species collected in Burma. From that species, *T. binghami*, it differs completely by the opaque and differently coloured tegmina and wings.

MIGRATIONS OF DRAGONFLIES.

By W. J. Lucas, B.A., F.E.S.

Such a powerful appearance have some of the larger dragonflies, and so considerable is their wing-expanse, that we are not surprised to hear of their making migrations to a great distance. The British dragonfly in which this propensity seems most strongly developed is undoubtedly *Libellula quadrimaculata*. Many flights of this insect, sometimes in enormous numbers, have been recorded, and it would seem that one or more flights of the same dragonfly have to be noted as having taken place during the early part of the present season.

Mr. H. Stocks, of Weybridge, a very careful observer, sends me the following communication:—"At Margate, on the 10th of June, I observed vast numbers of dragonflies flying about the cliffs. Do you think they were part of the swarm that visited the Continent some days previously? I much regret being unable to catch any specimens. They were of large size, with thick bodies of a dark brown colour, with wings a shade lighter, and different from any I have usually seen. I do not think they were bred near, as there are no rivers or ponds in the neighbourhood. I do not know much of the district, but their appearance was evidently uncommon, from the remarks one heard about them. By the end of the week they disappeared—at least, I did not see any more." On enquiry, Mr. Stocks tells me:—"The day was very warm, with a nice gentle breeze. I am not quite certain, but I think the wind was south-east, and I am under the impression there were more dragonflies in the evening than in the morning." There seems little doubt that the dragonflies were *Libellula quadrimaculata*, and that they formed part of the same or a similar swarm to that seen at Antwerp, and noticed in a very general way without a name to the insect in several of the daily papers just before Mr. Stocks' observation.

Writing to Mr. South on June 19th, Mr. G. Bolam, of Berwick, asked for the name of a dragonfly (*Libellula quadrimaculata*), of which he enclosed a specimen taken by a friend, and of which he said, "It was observed arriving upon the coast here on Sunday afternoon (presumably June 17th) in hundreds." He states that the captor observed it from three o'clock till half-past three in the afternoon coming up from the seashore over the low cliffs, and that they passed him almost continually in little parties of fours and fives at the rate, he estimated, of about five or ten per minute, and when he left the banks the flight seemed to show no signs of abating. The weather was warm and sunny, and the wind westerly. They mostly sailed inland without stopping on the sea-banks, and appeared to come direct from the sea. Mr. Bolam adds that, though he is quite familiar with the appearance of the insect, it is not common near Berwick.

Though a week later than the Margate flight, this may be part of the migration noticed on the Continent, which will probably turn out to be of this species, and of which we hope to hear more definitely when the observations appear in the entomological papers—newspaper entomology being, as a rule, useless for scientific purposes.

July 16th, 1900.

NOTES ON THE RESPIRATION OF THE DRAGONFLY NYMPH.

By Rev. Arthur East.

So little attention seems to have been devoted to the powers of breathing common air possessed by the dragonfly nymph, that a few somewhat elementary notes may perhaps be acceptable.

Two specimens of *Æschna cyanea* were taken from a pond in my garden in January of this year, and observations were made as to the length of time the nymph could live out of water. The nymphs were 20 mm. long when captured, and were restored to the water at varying intervals, and for different lengths of time; when out of water they were kept in a bottle with damp weed, and they fed, of course, only when restored to the water, so that the following summary of absence from the water means equally the time they went without food. The two nymphs observed are designated A and B :—

A. Nymph of *Æschna cyanea*.

Captured Jan. 1st, 1900, and put in bottle with damp weed.
Restored to water Jan. 3rd for 2 minutes.
,, ,, ,, 5th ,, 2 ,,
,, ,, ,, 8th ,, 30 ,,
,, ,, ,, 13th ,, 4 hours.
,, ,, ,, 18th ,, 6 ,,
,, ,, ,, 25th ,, 4 ,,
,, ,, Feb. 8th ,, 20 ,,

B. Nymph of *Æschna cyanea*.

Captured Jan. 19th, 1900.
Restored to water Jan. 24th for 4 hours.
,, ,, ,, 31st ,, 6½ ,,
,, ,, Feb. 8th ,, 20 ,,

On February 8th A and B were put together and kept out of water until March 8th. They were then finally restored to the water, and, after appearing somewhat lethargic for about an hour, recovered perfectly, and fed freely.

On March 16th I received some specimens of *Erythromma naias*, kindly sent me by Mr. Lucas; one of these was kept out of water, in similar conditions to the *Æ. cyanea* mentioned above, from March 16th to April 16th, and appeared quite well when restored to the water; and, curiously enough, during the time of enforced fasting the nymph cast a skin, becoming, however, slightly smaller, *viz.* from 27 mm. to 25 mm. in length. The change of skin occurred on April 7th.

It will be seen therefore that both these species are able to live a month at least out of water. As to whether the after development is affected I cannot say, as the nymphs were mixed with others, and undistinguishable; but they did not appear to suffer in any way.

Four nymphs of *Agrion puella* were also kept under observation. One of these apparently got tired of the experiment after three weeks, and wandered off, and was lost; but the other three were kept thirty-three days out of water, and appeared none the worse for it.

The power of fasting possessed by the nymphs is connected, I suspect, with the vexed question as to the time passed in the nymphal state. To give an instance: of several nymphs of *Æschna cyanea* caught in January last, all of which were of about the same size, *viz.* 20 mm. long, one had not changed a skin by April 15th, and had not grown at all; another had cast several skins by the same date, and was twice the length, *viz.* 40 mm.—a big nymph. I have now (June 8th) five of these nymphs just ready to emerge; but the small one referred to grows very slowly, and does not look like being ready to change this season.

May I mention, in reply to the query of Mr. Lucas, that when I said that the majority of my specimens of *Æ. cyanea* came out at night, I meant, not early morning particularly, but any time from late evening to midnight, and from midnight to early morning—an inconvenient habit for the photographer. I have many times covered up the nymphs just ready to emerge, in hope of inducing them to believe that darkness had really arrived; but I do not remember to have been successful in deceiving the nymphs, so as to persuade them that night had come.

Southleigh Vicarage, Witney, Oxon: June 8th, 1900.

THREE NEW SPECIES OF NYMPHALINÆ FROM SIAM.

By Percy I. Lathy.

Terinos falcipennis, sp. nov.

♂. Upper side: Fore wing rich violet, with brown velvety patch, as in *T. clarissa*, Boisd.; apex velvety brown. Hind wing rich violet, with velvety brown apical patch and brown costal border; outer margin dull ochraceous, as in *T. fulminans*, Butl., but almost without violet reflections, and containing two rows of obscure blackish lunules, which are most pronounced at anal angle. Under side: Fore wing olive-brown, with faint blue reflections about basal half; a dark brown spot below costa, and near apex outwardly bordered with whitish. Hind wing olive-brown, with bluish reflections on outer margin; a conspicuous white bar beyond cell, just beyond this a series of five brown spots between the nervules, two above and three below white bar, and beyond these a series of six obscure ochreous lunules. Exp. 84 mm.

Four males. In coll. H. J. Adams.

This species was originally described and figured by De Nicéville, Butt. Ind. vol. ii. p. 39, t. xxiii. f. 101, from a single male obtained by Captain Bingham in Upper Tenasserim; owing to want of material it was treated by him as *T. clarissa*, Boisd. The four specimens from Siam agree pretty well with the description and figure of the Tenasserim example, and are, I think, sufficiently distinct from the Bornean *T. clarissa* to rank as a local race, and receive a name.

T. falcipennis may be distinguished from *T. clarissa* by its more falcate fore wings, the more produced tail, and the much more obscure inner row of lunules of hind wings; on the under side by the obscurity of all its markings, with the exception of white bar beyond cell.

From *T. fulminans*, Butl., it differs in the richer violet of upper side, and below in same way as from *T. clarissa*.

Penthema mimetica, sp. nov.

♀. Upper side: Fore wing dark brown, strongly glossed with purplish blue, except on outer margin; an obscure whitish submarginal spot between middle and lower median nervules, and a geminate white spot at anal angle. Hind wing dark brown, basal half glossed with purple; a discal row of seven oval and a submarginal row of eight more or less sagittate white spots, the three posterior ones being confluent with those in the discal row; the submarginal spots outwardly bordered with dark brown; a whitish patch on inner margin near anal angle; cilia white between nervules. Under side: Fore wing purplish brown at base, paler towards outer margin; a purple spot at lower end of, and a row of six purple spots beyond cell, of which the fourth, counting from the costa, is much nearer cell than the others; beyond these a series of six small white-centred purple spots; submarginal markings more distinct than above, and an additional spot between upper and middle median nervule, and a few whitish scales on inner margin near anal angle. Hind wing as above, but paler, without purple gloss, and white markings more distinct. Exp. 116 mm.

One female. In coll. H. J. Adams.

This fine species is nearest to *P. binghami*, Wood-Mason, but may easily be distinguished from that species by the total absence of discal and partial absence of submarginal markings of fore wings; also by the beautiful blue and purple gloss. *P. mimetica* appears to mimic *Menama camaralzeman*, Butl.

Bassarona affinis, sp. nov.

♂. Upper side: Fore wing blackish brown, with a very indistinct black bar at end of cell, and series of submarginal spots; a discal band composed of seven pale greenish yellow spots, which decrease in size towards costa, the spot next costa being out of line, and nearer the base; a subapical spot of same colour. Hind wing blackish brown, paler at apex, and with an obscure dentate black submarginal band; a discal band composed of eight spots of same colour as on fore wing; this band is wider on inner margin than on costa; its inner border is regular, and outer dentate. Under side: Fore wing pale brown, with dark suffused patches at apex and anal angle; a round black spot within and a lunular black spot at end of cell, each centred with crimson; discal band as above, but narrower, and indistinctly edged with brown; subapical spot obscure; an indistinct submarginal row of blackish points. Hind wing pale brown; a small round black spot within and two black lines at end of cell; discal band as above, but obscure; a submarginal row of short black lines.

♀. Upper side: Fore wing olive-brown; a round black spot within and a lunular black spot at end of cell, both centred with ground colour, and the latter also containing an indistinct dull crimson streak; discal band composed of six well separated greenish white spots, the one next costa being the largest and oval, the four below triangular, and the sixth a small round spot; a small subapical spot of same colour; a submarginal series of indistinct blackish spots. Hind wing olive-brown; discal band represented by only four small greenish white spots extending from costa to centre of wing; a highly dentate blackish submarginal line bordered outwardly with whitish at apex. Under side: Fore wing pale reddish brown, with violet reflections beyond discal band; a large round spot within and a lunular spot at end of cell, each centred with crimson; discal band and subapical spot as above, the band indistinctly edged with brown; a submarginal row of indistinct blackish points. Hind wing pale reddish brown, with violet reflections beyond discal band; a black spot within and two black lines at end of cell; discal band composed of seven pale greenish white spots, the one next costa being oval and well separated from the rest, the next five triangular with apex pointing towards outer margin, the seventh and largest extending from lower median nervule to inner margin; a submarginal series of short black lines. Exp. ♂ 70 mm., ♀ 90 mm.

One male, two females. In coll. H. J. Adams.

This species is closely allied to *B. goodrichi*, Dist., from which it may be separated, in the male, by its much wider and yellower discal bands, and in the female by the total absence of discal bluish grey scaling. The second female obtained has the lower spot of discal band wanting in both wings.

Lynton Villa, Sydney Road, Enfield.

BRITISH DRAGONFLIES OF THE OLDER ENGLISH AUTHORS.

By W. J. Lucas, B.A., F.E.S.

(Continued from p. 175.)

5. *J. F. Stephens: 'Illustrations of British Entomology,'* vol. vi. Mandibulata, 1828–46. [Mandibulata 1835–37. Dragonflies, 1836.]

In 1829 Stevens published *A Systematic Catalogue of British Insects*, which is simply a list without any description whatever; but the work before us takes more the form of monographs of the various groups. As regards the Dragonflies, we find careful descriptions of all that were known to the author. Unfortunately his estimate of the number of species was much exaggerated, and this makes his work of very little practical use at the present day.

Family I. Agrionidæ.

Genus Agrion.

Sp. 1. **rubellum** = *Pyrrhosoma tenellum*. Figure poorly coloured (pl. xxix. f. 4).

2. **xanthopterum** = perhaps *Ischnura pumilio*, the orange var. *aurantiaca*.
3. **elegans** = *Ischnura elegans*.
4. **ezonatum** = perhaps *Ischnura elegans*, but description does not point clearly to it.
5. **Puella** = *Agrion pulchellum*, from the definite description of the shape of the spot on segment 2.
6. **furcatum** = *Agrion puella* for the same reason as for preceding species.
7. **hastulatum** = *Enallagma cyathigerum* no doubt; but the description of segment 2 is not quite satisfactory.
8. **annulare** = *Agrion puella* ♀.
9. **rufescens** = seems to be the orange variety of *Ischnura elegans*, only that Stephens gives two sexes, and the var. only occurs in the female.
10. **minium** = *Pyrrhosoma nymphula*.
11. **fulvipes** = *Pyrrhosoma nymphula*, ♂; the varietal form mentioned after the description seems to be *Pyrrhosoma tenellum*, ♀.

12. **chloridion** = *Erythromma naias.*
13. **platypoda** = *Platycnemis pennipes.* Var. *β albicans* is the pale form with reduced markings.

Genus Lestes.

Sp. 1. **viridis**
2. **nympha**
3. **forcipula**
= All appear to be *Lestes sponsa*—the first teneral, the second older, the third mature and powdered with blue.

Genus Calepteryx.

Sp. 1. **virgo** = partly *Calopteryx splendens*, and partly *C. virgo.* The vars. appear to be :—
α. = *C. splendens*, ♂.
β. = *C. virgo* ♂.
γ. = *C. virgo*, ♂ and ♀, immature.
δ. = *C. splendens*, ♀.
ε. = *C. virgo*, ♀, probably from the description of hind wings, but that of fore wings points to *C. splendens*, ♀.

2. **Ludoviciana** = *Calopteryx virgo*,
var. α. = *C. virgo*, ♂.
β. = *C. virgo*, ♂.
γ. = *C. virgo*, ♂ and ♀, the ♂ being immature or var. *anceps.*

3. **xanthostoma** ? = probably a very mature ♀ of *C. virgo.*
4. **anceps** = *C. virgo*, var. *anceps.*

Family II. Libellulidæ.

Genus Anax.

Sp. 1. **formosa** = *Anax imperator.*

Genus Æschna.

Sp. 1. **rufescens** = *Æschna isosceles.*
2. **grandis** = *Æschna grandis.*
3. **maculatissima** = *Æschna cyanea.*
4. **juncea** = *Æschna juncea.*
5. **mixta** = *Æschna mixta.*
6. **affinis** = *Æschna mixta.*
7. **vernalis** = *Brachytron pratense.*

Genus Cordulegaster.

Sp. **annulatus** = *Cordulegaster annulatus.*

Genus Gomphus.

Sp. 1. **forcipatus** ? = *Gomphus vulgatissimus.*
2. **flavipes** = *Gomphus flavipes* (figured pl. xxx. f. 1).

Genus Cordulia.

Sp. 1. **ænea** = *Cordulia ænea.*
2. **metallica** = perhaps *C. ænea* also. "Found in Metropolitan district in June—anal appendages short, lower pair triangular" can scarcely apply to *Somatochlora metallica.* The "acuminate process below the ninth segment of the ♀" does seem, however, to point to *metallica.* Possibly there is a little confusion among Stephens's specimens.
3. **Curtisii** = *Oxygastra curtisii.*

Genus LIBELLULA.

A. PLATETRUM.

Sp. 1. **depressa** = *Libellula depressa.*
2. **conspurcata** = *Libellula fulva.*

B. LEPTETRUM.

3. **quadrimaculata** = *Libellula quadrimaculata.*
4. **prænubila** = *Libellula quadrimaculata* var. *prænubila.*

C. ORTHETRUM.

5. **bimaculata** = *Libellula fulva*, ♀, and teneral ♂.
6. **cancellata** = *Orthetrum cancellatum.*
7. **cærulescens** = *Orthetrum cærulescens.*

D. SYMPETRUM.

8. **Scotica** = *Sympetrum scoticum.*
9. **pallidistigma** = Generally considered to be immature *S. scoticum;* but the size, pale legs, and the long pterostigma seem rather to point to *S. striolatum.*
10. **rufostigma** = *Sympetrum sanguineum.*
11. **angustipennis** = probably immature *S. sanguineum.*
12. **vulgata** = *Sympetrum striolatum.*
13. **basalis** = apparently immature *S. sanguineum.*
14. **flaveola** = *Sympetrum flaveolum.*

ON A SMALL COLLECTION OF BEES FROM JUAREZ, MEXICO.

By T. D. A. COCKERELL, M.M.Agr.Exp.Sta.

ON Oct. 6th, 1899, I had the opportunity of spending a little while at Juarez, in the State of Chihuahua, and of collecting there the bees enumerated below. The species marked with an asterisk had not previously been reported from Mexico.

*(1.) *Halictus pectoraloides*, Ckll., one female, at flowers of *Aster (Leucosyris) spinosus.*

*(2.) *Perdita sphæralceæ*, Ckll., one female, at flowers of *Sphæralcea fendleri lobata.*†

*(3.) *P. heliotropii*, Ckll.; see Entom., 1900, p. 63.

(4.) *P. albipennis* var. *helianthi*, Ckll., one female, at flowers of *Helianthus annuus.*

*(5.) *Andrena pulchella*, Rob., one female, at flowers of *Helianthus annuus.*

(6.) *Melissodes agilis*, Cress., one male, two females, at flowers of *Helianthus annuus.*

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† This is *Sphæralcea lobata*, Wooton, Bull. Torrey Bot. Club, xxv. 1898, p. 306. At Mesilla Park, N.M., it varies into a form having leaves exactly as in the type of *S. fendleri*, Gray, of which it may be considered a subspecies. The plant is new to the flora of Mexico.

*(7.) *M. tristis*, Ckll., one male, at flowers of *Ipomœa mexicana.*

*(8.) *Anthophora vallarum*, Ckll., one male, two females, at flowers of *Ipomœa mexicana.*

(9.) *Megachile occidentalis*, Fox, one male, at flowers of *Helianthus annuus.*

(10.) *Xylocopa arizonensis*, Cress., one female, at flowers of *Ipomœa mexicana.* Instead of entering the corolla, it cut a slit on the outside, near the base.

MOSQUITOS AND MALARIA.

By Guy A. K. Marshall, F.Z.S.

As the above subject hardly appears to have received the attention it merits in British entomological journals, it was a pleasure to read Mr. G. W. Kirkaldy's all too short *résumé* of the views of Celli and Grassi on the question in the 'Entomologist' for April, 1900. The facts and contentions set forth in this *résumé* would seem to leave but little doubt that mosquitos of the genus *Anopheles* are the sole carriers of malarial contagion, and that they themselves can, in turn, only acquire the parasites from malarial man. Yet the fact remains that in a malarious country like Mashonaland, where probably three-fourths of the inhabitants have had a practical experience of the disease, the theory is regarded with a considerable amount of scepticism, not merely by laymen, but also by the majority of medical men. While personally I do not share this scepticism, I can yet appreciate the difficulties which stand in the way of the acceptance of the theory in its present form, when tested by experience in a malarial country; and therefore it may be useful to draw attention to these counter-arguments, in the hope that they may be satisfactorily explained away.

If we accept the proposition that malaria can only exist in the presence of two factors, *viz.* malarial man and *Anopheles*, then we are logically bound to accept the conclusion that, if a man, or party of men, free from malarial poison, should penetrate from a healthy area into an unhealthy, but uninhabited, region, it would be impossible for them to contract fever, however much they might be bitten by mosquitos; further, it follows that all uninhabited regions, even of comparatively small size (seeing that the range of individual specimens of *Anopheles* is apparently very limited in extent), must be entirely devoid of malaria, even though they may be full of swamps, and teem with mosquitos.

Such conclusions certainly do not appear to be borne out by experience. It would doubtless be difficult to find many areas in

Europe which present these supposed conditions, but in a sparsely populated country like Africa they may be found on every hand. In Mashonaland we have numberless areas of this description, but perhaps the most typical are to be found in the Umfuli District, where there are considerable tracts of land rendered uninhabitable owing to the fact that they contain no surface-water during the dry season, although during the rains they may be sometimes under water for several weeks at a time; and yet these very localities are among the most unhealthy in the country. Again, in the Northern Transvaal there are large stretches of totally unpopulated country, more especially where the brackish rivers prevail; and yet it is a matter of common knowledge that the Boer hunters who used to penetrate into these wildernesses from the healthy high veldt invariably suffered severely from malarial fever.

Another conclusion which must be drawn from the theory as it now stands is that in any malarial region where *Anopheles* is generally distributed the most unhealthy portions must necessarily be those in which the population is thickest. This conclusion is practically the exact reverse of what is actually the case in this country, at least so far as the white population is concerned. For example, Salisbury is by far the most densely populated portion of Mashonaland, and, further, I have found three species, if not four, of *Anopheles* in the town, one of which is certainly common; moreover, not only is a mild form of fever prevalent in the district, but also all the severer cases of fever from the lower veldt are brought into the town for treatment, thus creating a continual supply of foci for the distribution of the disease. And yet despite all this there can be absolutely no question that Salisbury is far more healthy than the vast majority of the sparsely populated districts which surround it, although in these latter the chances that a mosquito will carry malarial contagion from one man to another are necessarily more remote, and, indeed, often infinitesimal.

In fine, the theory proposed by Grassi amounts to this: given *Anopheles* and a certain number of malarial patients, then locality goes for nothing in the causation of malaria; a position which is, to my mind, untenable.

The foregoing objections do not in any way militate against the supposition that *Anopheles* is the sole carrier of malaria, but only affect the proposed explanation as to how the mosquito itself is infected. Other objections, however, are raised on the ground that there is reason to believe that fever can be acquired otherwise than through the agency of mosquitos.

The argument most generally adduced is that ploughing is in itself a very unhealthy occupation in malarial districts, more particularly where new ground is being broken up, and that in such cases mosquitos cannot reasonably be regarded as a factor.

The correspondent of the Sierra Leone Expedition, writing to the 'British Medical Journal,' endeavours to explain this on the supposition that the breaking up of the soil would tend to cause puddles suitable for the breeding of *Anopheles*. But the explanation does not carry conviction; firstly, because the loosening of the soil would rather tend to increase percolation than to aid in the formation of puddles, more especially as ground that has a tendency to hold water is generally avoided for agricultural purposes; and, secondly, if *Anopheles* be already present, as his explanation predicates, there is no reason why the formation of a few more puddles should necessarily result in an attack of malaria for the ploughman, apart from the fact that the effects, as usually stated, follow too rapidly to allow of an explanation on these lines. I am inclined to believe, however, that, when properly investigated, the supposed connection between the breaking up of land and the occurrence of malarial fever will be found to be more apparent than real.

Finally, I may mention the difficulty that frequently occurs in tracing any given attack of fever to the bites of mosquitos. For example, to refer again to the Sierra Leone Expedition, in one article the correspondent states that Mr. Austen was the only member who had so far suffered from fever, he having on one occasion slept without a mosquito-net, although he had no knowledge of having been bitten. And many similar cases might be adduced where persons who have suffered from malaria are quite positive that they have not been previously bitten by mosquitos; this being perhaps the commonest objection to the theory, for it is argued that the average mosquito has an unpleasant way of making her presence felt, if not at the time, at all events afterwards. This difficulty might be removed if it could be proved that the poison of *Anopheles* is of a much less irritant character than that of *Culex*, so that the bite would not be noticed during sleep, and would leave little or no subsequent irritation. The little evidence before me tends to support this view, though unfortunately the idea occurred to me too late to enable me to test it by experiment last fever season. Could this be demonstrated it would remove a considerable amount of opposition to the theory, and, further, it might perhaps in some degree account for the fact that the malarial parasite can flourish in *Anopheles*, and not in *Culex*.

Salisbury, Mashonaland: May, 1900.

DIPHYLETISM IN THE LEPIDOPTERA.

By Ambrose Quail, F.E.S.

In his paper (*ante*, p. 120) Prof. Grote did me the honour of mentioning my name; therefore I claim the privilege of reply. Grote's separation of the Papilionides from all other butterflies in phylogeny is based on the presence in the former of a short anal nervure on primaries, which he calls IX, and for which Dr. Chapman proposes the name "Grote's vein." I do not propose here to discuss the modifications of neuration to be observed in the Rhopalocera, having done so elsewhere;* and I have also given reasons for believing that "Grote's vein" is homologous of the rudimentary anal nervure on primaries of other groups.† I will, however, take up this particular question of the homology of "Grote's vein." Curiously, the only direct reference by Prof. Grote that I am able to find is worded: "IX applied only by me; . . . . whether this is homologous with VIII, to which it is opposed in position, is uncertain."‡ I now quote Dr. Karl Jordan:—"It remains for Prof. Grote to show that what he styles in Papilionidæ vein IX (absent from all other butterflies, according to Grote) is *not* homologous of what he calls in the other butterflies vein VIII (absent from Papilionidæ, according to Grote)."§

If we direct our attention to the neuration of the whole Lepidoptera, a very suggestive fact is observable, that is, nowhere can we find more than two definite anal nervures on the primaries; usually there is also a short vein, attached near its base to that anal nervure farthest from the cubital system. I at least have been unable to find more than these. In extremely rare instances the latter rudimentary vein has a projection beyond the normal juncture, which clearly indicates that it is the remnant of a third anal nervure. I may mention, of my own observation, *Zeuzera d'urvillei*, Schiff., an Australian species; *Cossus robiniæ,* an American species. Comstock‖ gives a figure in Psychidæ, No 253, and another in Megalopygidæ, No. 247; the latter is most pronounced in its indication. We may also observe that the anal nervure nearest the cubital system (present in Cossidæ, &c.) has been lost from the primaries of many Heterocera, leaving only one anal nervure—that with the rudimentary attachment; the missing anal nervure is often, in fact generally, indicated by a scar.

Compare the Rhopalocera with other groups of Lepidoptera, and observe the identical modification of neuration last mentioned, *viz.* loss of inner anal nervure, retention of outer anal nervure, with attached rudimentary (VIII), in all groups except Papilionides; in the latter we have not the rudiment, but an actual nervure = "Grote's vein." It seems to me an indisputable indication that "Grote's vein" is homologous of VIII.

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* North London Nat. Hist. Soc. 1896; extract, 'Entom. Record,' vol. ix.

† 'Natural Science,' vol. xiii. p. 391, 1898.

‡ *Ibid.* vol. xii. p. 88, 1898.

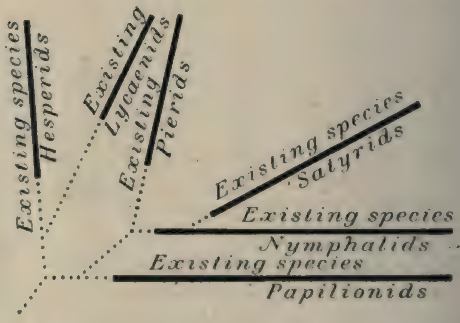
§ *Ibid.* vol. xiv. p. 79, 1899.

‖ Comstock, 'Text-book,' 1895 ?.

At first sight it appears remarkable that Papilionids should have retained that nervure, even if homologous of VIII, which has become rudimentary so generally in the Lepidoptera; but we must regard its persistence in so many groups of the Lepidoptera, which actually lose one other anal nervure, as evidence that it (VIII) is of actual value as a part of the wing-structure, whether retained as rudimentary or as a "vein" (Grote's), is a matter of degree only; clearly we have no evidence that VIII and "Grote's vein" are morphologically distinct.

If we look for evidence of affinity between Papilionides and the other butterflies, we find in generalised Nymphalids (*Anosia*) a "cubital blotch" on primaries, and a "subcostal-radius connection" on secondaries; their identity cannot be doubted, as remnants of the "cubitus-anal connection" of primaries and "humeral cell" of secondaries are retained in Papilionidæ. It detracts nothing from their value as indication of affinity when we observe that amongst higher Nymphalids and other groups they are completely lost; since we find, as Prof. Grote has shown,* that the "cubitus-anal connection" of primaries and the "humeral cell" of secondaries are not present amongst higher Papilionids.

I can only repeat my original conclusion from a study of the neuration; † generalised Hesperids, Nymphalid-Pierids, Papilionids "represent the surviving links in the continuity of specialization, a primary modification of neuration antecedent to and quite apart from the special modifications peculiar to the several groups." Thus—



Neuration of the wings is only one of the many structural characters, imaginal and embryological, which go to establish affinities, any one of which by itself may mislead. May I give an example? By movement of the fourth radial of primaries, *Porina* has a different wing-pattern to that of *Hepialus*; by neuration,

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[*] 'Natural Science,' vol. xiv. p. 79, 1899.

[†] *Ibid.* vol. xiii. p. 395, 1898.

Trictena identifies with *Hepialus*, the antennal structure of *Trictena* is distinctly a specialized *Porina;* wing-scales, *Trictena* resembles *Hepialus* (*Charagia*). Pupal characters of *Trictena* are those of *Porina*, especially in regard to the spines of seventh abdominal segments. (MSS. Quail.)

Palmerston North, New Zealand: May 20th, 1900.

NOTES AND OBSERVATIONS.

LYCÆNA PHERETES AND ITS ALLIES IN THE SIKKIM HIMALAYAS.—In the July number of the 'Entomologist,' p. 199, Mr. Harcourt-Bath describes two new forms as *Lycæna sikkima* and *Lycæna altissima*, and has been good enough to send me specimens of them to compare. I have described in P.Z.S., 1882, p. 402, *L. pheretes* var. *asiatica*, from two male and four female specimens received from native collectors, whom I sent to the Chumbi Valley, which were probably taken on or near the Jeleplah Pass, at about the same elevation as Mr. H.-Bath's, which were taken in the Lachoong valley. Of his three forms, no. 1, which he thinks is the same as mine, is larger, and in the male of a brighter blue than in European *L. pheretes*, and resembles in tint males from Ladak; *L. lehana*, Moore, which are smaller; and others, from E. Tibet, sent me by Messrs. Leech and Oberthür, which are larger. No. 2, which Mr. Bath calls *L. sikkima*, is just like some of my var. *asiatica*, and, though of much duller blue, is, I think, only an extreme form of it. Mr. Bath says "aberrations were found somewhat intermediate between the two." Of no. 3, which he calls *L. altissima*, he sent me two females; the first, which agrees with his description of *altissima*, male, is a female of his *sikkima*, with a good deal of blue gloss on the upper side. I have a very similar specimen of *L. pheretes*, female, from the Hindu-Kush mountains, and find the blue gloss more or less present in several Asiatic and a few European female *L. pheretes*. The other specimen is just like my females of var. *asiatica*, except that the pale discal spot, as in the first specimen, is prominent, as in some female *L. pheretes* from Europe and Asia. I have, therefore, no doubt that these three forms are all referable to *L. pheretes;* and, if a separate name is wanted (which I rather doubt), *lehana*, Moore, is the oldest.—H. T. ELWES.

LYCÆNA PHERETES, ETC.—I must apologise for troubling you to rectify an error (*ante*, p. 200) which was owing to a slip of the memory and want of precaution in not examining the genitalia, as I find that the pale dimorphic variety of the female of *L. altissima* (mihi) was described as the male, whereas the latter is blue, but of a duller tint than that of the male of *L. sikkima* (mihi), with which it unfortunately got mixed up at the time of setting. It is, of course, merely a matter of opinion whether the above should be considered local varieties of, or distinct species from, *L. pheretes*, their nearest ally; but, personally, I prefer to consider all local forms as distinct species, provided their morphological characters are sufficiently distinct.—W. HARCOURT-BATH.

Parasite in Lepidopterous Ovum.—During the first week of July, while collecting a few miles from Beaconsfield, I found a few eggs of *Ptilodontis palpina* on some small aspen bushes. A day or two ago I was much surprised by *three* ichneumon flies emerging from one of these eggs.—G. F. Bird; Rosedale, 162, Dalling Road, Hammersmith, W., July 23rd, 1900.

Oviposition of Polygonia c-album.—My attention has been directed to a note by Mr. South (Entom. xxx. p. 173, 1897), where he quotes Mr. Frohawk's observations that the eggs of this butterfly are laid singly. I only once took the trouble to get this butterfly to lay eggs, and it then laid them in short chains of two, three, and four. No doubt Mr. Frohawk's observations, like mine, were made on the butterfly in captivity. So it is very possible that his observation, or mine, was vitiated by an abnormal habit caused by this circumstance. It seems to me more probable that this butterfly varies in its habits in different individuals. All I can testify to, however, is that *c-album* does, upon occasion at least, lay its eggs in chains, like its American kindred.—T. A. Chapman; Betula, Reigate.

Pairing of Vanessa urticæ and Epinephele ianira.—This morning, while walking down from my house to the town, I noticed two butterflies *in cop.* on a wall by the side of the road. I cautiously approached them, when I was much surprised to find that they were not of the same species—the male being *Vanessa urticæ*, and the female *Epinephele ianira*. I had no apparatus with me, but I succeeded in catching the two insects in my fingers, and brought them back to my house, where I placed them in a breeding-cage. Should the female lay any eggs, I should be very happy to send them to anybody who would care to try and rear them.—J. Williams Vaughan; Bryn-y-Mor, Tenby, July 11th, 1900.

Habits of Cossus ligniperda.—The interesting note by Mr. Robt. Adkin on this subject (*ante*, p. 128), recalls to my mind many pleasant excursions in the past in search of this species. Mr. F. B. Harvey, Mr. M. Culpin, and others will recollect the Chingford locality, which, some ten years and more ago, we used to call the "*Cossus* ground"; between us, I believe, we learnt a good deal relative to its habits. One experience, but an instance from natural choice of the larva, resembles Mr. Adkin's experiment—"full-fed larvæ placed in the dry stump of a limb, produced imagines." I have recorded elsewhere (Ent. Rec. ii. 211) how, in 1889, my friend Culpin and myself procured dozens of the larvæ, which had gone into cocoon for the winter, from the old stumps of willow trees, which had been cut down some years before. Undoubtedly the larvæ, when full-fed, usually leave the larval burrow, and search for a suitable place in which to make the winter cocoon. They do, however, pupate in the locality of, if not actually in, the larval burrow. We have not unfrequently taken the imago drying its wings, just above the empty pupa-case protruding from a hole through bark and tough wood. Moreover, in some instances, until the pupa broke through the bark, there was no evidence of the existing tunnel; in this respect the habit is similar to that of the Australasian Hepialidæ—*i.e.* the wood-borers—which, however, never leave the larval burrow until the imago stage. *Zeuzera pyrini* pupates in the larval burrow. Dr. May's note clearly indicates that *Cossus ligniperda* does, at times, pupate in the earth. I have seen other records. Mr. J. A. Clark, if my memory serves me, had one or two examples of pupæ which pupated in earth, in his very interesting collection illustrating the life-history of this species. The life-history of *Cossus*, which I prepared some years ago, now in the possession of Mr. F. B. Harvey, illustrated the actual position of the pupal cocoon in relation to the burrow through the bark of the tree.—Ambrose Quail; Palmerston N., New Zealand, May 23rd, 1900.

CAPTURES AND FIELD REPORTS.

Coremia quadrifasciaria in Essex.—On Friday last, June 29th, I was beating the tall hedges round Hazeleigh Wood, when a very dusky Geometer came out, and scurried away over a recently-cut clover field. Thinking it was *Larentia didymata*, of which I want a new series, I went in hot pursuit, and, with some difficulty, succeeded in netting the obscure fugitive, which, to my surprise and delight, turned out to be a fine male *C. quadrifasciaria*. This species was recorded, some twenty years ago (in the 'Entomologist,' I think), as having been taken by a Londoner when visiting Danbury, three miles from here. It is, no doubt, a scarce species; but generally to be obtained by beating hedgerows in the daytime or netting at dusk, where it is known to occur. I have taken it at Brentwood and Harlow in this county, and at Fordham in Cambridgeshire; and, in 1896, I took a specimen at Panton in mid-Lincolnshire, which I believe to be the most northerly record in the British Isles.—(Rev.) Gilbert H. Raynor; Hazeleigh Rectory, Maldon, July 3rd, 1900.

Colias edusa and C. hyale at Eastbourne.—I obtained two specimens of *C. hyale* and one example of *C. edusa* in a clover field on the cliffs near Beachy Head, on June 12th. The *edusa* was worn, and looked as if it had hybernated; but the *hyale* were perfect.—Stanley A. Blenkarn.

Anticlea sinuata.—I took two examples of *A. sinuata*, on July 13th, at Cranborne, Dorset.—T. H. Fisher; Cranborne Vicarage.

Æschna cyanea at Paddington.—A not full-coloured example of *Æschna cyanea* flew into one of our offices here last Friday; and one of the clerks gave it to me.—Fred. Noad Clark; Paddington Infirmary, Harrow Road, W., July 18th, 1900.

Ischnura elegans in London.—Mr. F. N. Clark has sent me a couple of specimens of the small dragonfly, *Ischnura elegans*, taken from the banks of the Grand Junction Canal, adjoining the Paddington Infirmary. As this dragonfly is scarcely capable of migration, the specimens must be looked upon as true-born Londoners, and a record of their capture is, therefore, of interest.—W. J. Lucas; July 3rd, 1900.

Collecting in Hayward's Heath District.—I shall be very much obliged if any of your readers could inform me of any places, open to the public, which are good for insects in the Hayward's Heath (Sussex) district.

We are surrounded here by the Balcombe, St. Leonard's, and Ashdown forests, and there should be many places well worth visiting by entomologists. I believe, in days gone by, *Apatura iris* was to be had in Balcombe Forest, but I do not know in what part, or whether it is open to the public. —A. H. Rydon; Awbrook, Lindfield, Sussex, July 1st, 1900.

Note on a Spider.—Last week a farmer brought an enormous black spider which he had caught upon an adjacent bog, and thought I might like to have it for my collection. Never having seen anything like it before, I forwarded it to the Science and Art Museum, where it has been kindly named: it is a specimen of *Dolomedes fimbriatus.* This species has been found in Connemara and Galway, but, hitherto, only once in Leinster (this year at Tullamore). So West Meath has proved fortunate in finding it a second time.—Frances J. Battersby; Cromlyn, Rathowen, Co. West Meath, June 13th, 1900. [The above note may interest those of our readers who study the Arachnida.—Ed.]

New Forest Notes.—Though, perhaps, we must believe the experienced collector who tells us that the "Forest" is "played out," yet the lepidopterist who spends a few days there, unless he be very *blasé*, and provided that the weather is respectable, always enjoys himself thoroughly, and comes back with boxes much fuller than when he started. Arrived at Brockenhurst the Saturday before Whit Monday, we started out for a little dusking at Queen's Bower, where we met certain members of the South London Entomological Society, just returning to Brockenhurst after a day's collecting.

Bapta temerata, *Larentia pectinaria*, *Ephyra omicronaria*, *E. trilinearia*, *Lomaspilis marginata*, *Ligdia adustata*, *Melanthia ocellata*, *Melanippe montanata*, *Cabera pusaria*, *Panagra petraria*, *Cilix spinula*, and *Pechypogon barbalis* were netted; whilst from heath two larvæ of *Noctua neglecta*, and an example of *Syrichthus malvæ* were swept. Day work was very fair. *Pieris rapæ* and *P. napi* were common, but *Euchloë* (*Anthocharis*) *cardamines* was decidedly scarce. *Gonepteryx rhamni*, abundant, *Argynnis euphrosyne* was undoubtedly the most plentiful butterfly seen, and one battered example of *Vanessa polychloros* was netted With regard to *Pararge egeria* the first brood was practically over and in very bad condition, but during the last two days of our stay, six magnificent specimens, evidently quite fresh from the pupæ, were taken. *P. megæra* was fairly fresh, but common. *Cœnonympha pamphilus* was far from common, but in fine condition. *Thecla rubi* was not uncommon among hawthorn and blackthorn, but decidedly local, and none too easy to catch. *Polyommatus phlæas* very fine, but not common. *Lycæna icarus* was just coming out, and became more plentiful towards the end of the week. *L. argiolus*, as at most localities this season, was exceptionally abundant, but over as far as condition goes. *Nemeobius lucina* was not too common in the neighbourhood of Stubby Copse, and a short series only was secured. *Syrichthus malvæ* (common) and *Thanaos tages* (locally abundant) complete the list of butterflies.

Turning to the moths, one of the most noticeable features was the absence of Noctuæ. Treacle was fruitless, nor did the flowering plants appear to attract any visitors—apparently there were none to attract. The only three species noticed were the sun-loving *Euclidia mi* and *Phytometra ænea* (both common), and a single *Euplexia lucipara* beaten from oak. *Macroglossa fusiformis* was fairly common at the azaleas at Rhinefield, and at the common bugle in another locality, but only one bad *M. bombyliformis* was taken; the latter seems by far the scarcer insect. A few *Hepialus lupulinus* were seen at rest. *Halias* (*Hylophila*) *prasinana* was beaten not uncommonly from oak, and *Euchelia jacobææ* was noticed abundantly flying in the sunshine. A few females of *Spilosoma mendica* were taken, most of which laid freely in chip boxes, and one male was beaten from oak; about two hundred young larvæ are now feeding up well on plum. Single examples of *Drepana lacertinaria* and *D. falcataria* were taken, and *Cilix glaucata* (*spinula*) was fairly common. One specimen of *Phalera bucephala* was beaten from oak. Geometers were better represented, though most of the species were common ones:—*Rumia cratægata*, *Venilia macularia*, *Odontopera bidentata* (two), *Amphidasys betularia* (a female), *Boarmia roboraria* (two males), *Iodis lactearia* (a few, beautifully fresh and green), *Ephyra porata*, *E. punctaria*, *E. trilinearia*, *E. omicronaria* (a few), *Acidalia remutaria Cabera pusaria*, *C. exanthemata*, *Bapta temerata* (two), *B. taminata*, *Macaria liturata*, *Panagra petraria*, *Fidonia atomaria* (abundant), *F. piniaria* (one female, males very abundant), *Ligdia adustata*, *Lomaspilis marginata*, *Larentia pectinaria*, *Melanthia ocellata*, *Melanippe subtristata*, *M. montanata*, *Coremia propugnata*, *C. ferrugata*, *C. unidentaria*, *Triphosa dubitata* (a hybernated female), *Cidaria corylata* (three), and *Anaitis plagiata* (four). The Deltoides were represented by one species only, *Pechypogon barbalis*, which was very abundant—in fact, six specimens, on one occasion, flew off one oak bough. Of the Pyralides, *Pyrausta purpuralis* alone was noticed; and of the Pterophoridæ, three specimens of *Alucita hexadactyla*.

By far the best work among the "Leps" was undoubtedly larva-beating, which was practically neglected until the Friday; but both Friday and Saturday were devoted to it, with the following results:—*Limenitis sybilla* (full-grown), *Thecla quercus* (common, and mostly full-grown), *Nola strigula*, *Gnophria quadra*, *Liparis auriflua* (*Porthesia similis*), *Psilura monacha* (abundant), *Pœcilocampa populi*, *Orgyia antiqua*, *Halias bicolorana* (*quercana*), *Diloba cæruleocephala*, *Asphalia ridens* (a great many died while small), *Tæniocampa miniosa*, *T. stabilis*, and *T. cruda* (both the latter abundant), *Scopelosoma satellitia*, *Cosmia trapezina* (very abundant), *Amphipyra pyramidea*, *Catocala sponsa*, *C. promissa*, *Drymonia* (*Notodonta*) *chaonia*, *Phorodesma bajularia*, *Phigalia pedaria* (*pilosaria*), and *Himera pennaria* (last two abundant, but nearly all ichneumoned), *Ennomos angularia*, *Amphidasys prodromaria* (all very small, but are now full-grown), *Hybernia defoliaria*, *H. aurantiaria*, *H. progemmmaria*, *H. leucophearia*, *H. rupicapraria*, *Hemithea thymiaria*, *Oporabia dilutata*, and *Eupithecia abbreviata* (?). Besides these, a single larva of *Epinephele tithonus* was found on grass, and six larvæ of *Noctua neglecta* (?), and a few *Eubolia palumbaria* were swept from heath.

Two mornings were spent with Mr. W. J. Lucas in collecting dragonflies, and some good work was done. *Libellula depressa* was seen nearly every day; but seeing is not everything with this insect, which seems almost human in its cleverness, always avoiding the bank on which one is standing, but settling on various points on the other banks; but if one goes and stands by one of its resting-places, it will desert it and find a new one on the bank just vacated by the anxious collector; it also seems fond of settling on brambles and furze-bushes, for the express purpose of tearing one's net. However, about five specimens were captured. *L. quadrimaculata* also wants catching (though it doesn't want to be caught), and two specimens only were netted. *Orthetrum cærulescens* was just coming out, and fairly common. Of *Gomphus vulgatissimus*, which is by no means so common as its name would lead one to expect, four specimens were taken (two of them by Mr. Lucas). A single example of the handsome *Cordulegaster annulatus* was secured; it had recently emerged and was drying itself on a reed, the empty nymph-case being found on the other side of the stem. Five specimens of *Brachytron pratense* were netted, flying over a pond in the neighbourhood of Beaulieu Road, where it appeared to be common. This is another dragonfly which seems somewhat hard to catch, flying low and swiftly over the water—they seemed, however, fond of flying through a narrow channel formed by the water running between a small island and the bank, and here they were easily netted. *Calopteryx virgo* was common nearly everywhere, but of immature colouring. *Platycnemis pennipes* was fairly common, and *Pyrrhosoma nymphula* very abundant; three specimens of a variety of the female were taken, in which the red of the abdomen is effaced by the black, the segmental divisions being yellowish. *The* catch, however, was *Ischnura pumilio*, eleven specimens being taken (seven by Mr. Lucas, already recorded). A few *I. elegans* were netted. *Agrion puella* was very common, and a few *A. mercuriale* were taken.

Altogether a very pleasant and profitable holiday was spent, rendered far more so than it would otherwise have been by the companionship of others of like pursuits.—F. M. B. Carr; 46, Handen Road, Lee, S.E., July 7th, 1900.

Colias edusa at Ringwood.—On the 23rd inst. I distinctly saw a specimen of this butterfly. It flew over the river into an adjoining meadow, thus making capture impossible.—Fred. G. Bellamy; Ringwood, June 25th, 1900.

Colias edusa in Somersetshire.—On June 23rd my friend Mr. E. Copper, whilst collecting in the vicinity of Wiveliscombe, Somersetshire, captured one female and two male specimens of *C. edusa*. One male is in perfect condition. These were the only examples seen by him.—A. Cant; 54, Weymouth Street, W.

Colias edusa in Devonshire.—After the last three weeks of dull wet weather, I was agreeably surprised this morning to see a specimen of *C. edusa* making the most of a gleam of sunshine in the grounds of the barracks here. Whether this will turn out an "*edusa* year," I leave to August and September to determine.—T. B. Fletcher; Royal Naval Barracks, Devonport, June 22nd, 1900.

A Winter Day's Sport with the Net in Durban, Natal, South Africa.—On June 26th, which is equivalent to Dec. 26th in England, I started out for a day's sport in the Stella bush, about two and a half miles from the town, and my captures for the day were as follows:—Eight *Danais chrysippus*, four vars.; this species was in great evidence, and I could easily have taken a hundred, in fact it was flying in great numbers even in the town. *Mylothris agathina* was the next most common insect; it was in perfect condition, and very easily netted. *Eurytela hiarbas*, which greatly resembles our *L. sibylla*, and has the same graceful flight, was fairly plentiful. Two *Cebrene junonia* and three *C. cheli*; both these were the winter forms, and although just as brilliant, were much smaller than the summer brood. Six *Teracolus theogone*, three *T. evippe*, and two of the rarer *T. jobina*, were all I obtained of this family. Of the whites, *Pieris severina* simply swarmed, and *P. charina* was fairly common, but I only netted two *P. alba* and four *P. gidica*. *Pontia alcesta* was common in one spot only, and I took four males and six females; this fly greatly resembles the British *Leucophasia sinapis;* it has the same slow flight, and is very easily captured. Four *Atella phalanta* gave me some trouble to net, and I missed several others. *Hypanis ilithyia* were very common, and I took six specimens, the under sides of which were all different to the type. Of the Acræas *A. buxtoni* was certainly the commonest, and I took ten examples; also two of *A. petræa*, one only of *A. nohara*, and three *A. doubledayi*—one male a very beautiful red variety. Of the larger kinds I was only successful in getting two *Charaxes varanes*, one very chipped; three *Papilio cenea*, two males and one female; the latter is totally different to the male, and imitates for protective purposes *Amauriss echeria*, of which I easily took eight specimens, five of the yellow and black, and three of the white and black forms. Two *Melanitis leda* I obtained, after great trouble, and, for a wonder, in good condition. *Eronia cleodora* also turned up at intervals, and I netted four, after a good chase in every case. Four *C. edusa* and two *V. cardui* were the only insects that occur in England that I saw, or in fact have seen since my arrival here. Two *P. natalica* I found at rest, one in splendid condition. Of the blues I captured four *Hypolycæna buxtoni*, two *Lycæna bœtica*, and a pair of *Myrina dermaptera* I took in grand condition *in cop.*; this is by far the prettiest blue I have yet seen; it greatly resembles our *Thecla quercus*, but is larger and has beautiful purple-red long tails. Two *Terias regularis* and five *T. zoë* were all I captured, but the latter was very abundant. Of the skippers I took eight *Pyrgus vindex*, two *Hesperia forestan*, three *Pamphila hottentota*, two *P. mohopaani*, six *Crenis natalenses*, and one specimen each of *Neptis marpessa*, *Mycalesis safitza*, *Precis elgiva*, *P. tukuoa*, *Teracolus annæ* (a beautiful var), *Euralia tarquinia*, *Charaxes neanthes*, and *Salamis anacardii* (mother of pearl) completed the butterflies. Of moths very few are named here, but I took on the tree-trunks seven Geometers greatly resembling our *Boarmia consortaria*, and also nine pupæ of the hawk-moth, *Nephele hesperus* (? *argentifera*), and five pupæ of *Macroglossa trochilus;* three of the latter have since emerged. I also dug about thirty pupæ of various Noctuas. I arrived home about 6 p.m., well satisfied with the day's result, and all were taken in an area of half a mile square. To any entomologist arriving from England, the great number of butterflies on the wing in one spot is quite bewildering, and it requires great care to net the one you desire to catch. I am sending home moths from time to time to England to obtain their names, as it is almost impossible to get them here, and many, I believe, are not known at all. I may mention that collecting goes on all the year round here, and that this is considered to be a very bad season, owing to lack of rain. I may mention that I took an example of *D. celerio* on June 20th.—G. F. Leigh; Musgrave Road, Durban, Natal, June 30th, 1900.

SOCIETIES.

South London Entomological and Natural History Society.—*June* 14*th*, 1900.—The President in the chair. Dr. Chapman exhibited bred specimens of *Orgyia antiqua* from the South of France, and noted that the black markings were much intensified. Mr. Turner, specimens of the Coccid, *Pulvinaria ribesiæ*, the white woolly scale, from his own garden, and read notes on its occurrence. Mr. Enock, a living female of *Ranatra linearis*, with its ova, which are deposited in leaves and stems of water-plants, and are attached to a curious Y-shaped body; also living nymphs of *Erythromma najas* and *Ischnura elegans*. Mr. Clark, micro-photographs of the ova of several species of Lepidoptera, including *Cyaniris argiolus* and *Hadena genistæ*. Mr. Lucas read the report of the field meeting to Oxshott, and illustrated his remarks by a large number of lantern-slides of well-known spots in the district.—Hy. J. Turner, *Hon. Report Sec.*

Lancashire and Cheshire Entomological Society.—On June 23rd the President, Mr. S. J. Capper, gave a garden party to the members of this Society and other entomological friends at his residence, Huyton Park. About a hundred were invited, and there was a large gathering. Mr. Capper has been President of the Society since its foundation twenty-three years ago, and in his address in January last he invited the members to this gathering, as it would afford them, especially the younger members, an opportunity of inspecting his collection of British Lepidoptera and his educational collection of all orders of insects. His collection of British Lepidoptera, which occupies considerably more than a hundred large drawers, was for the occasion specially displayed on large tables, and afforded a magnificent sight. This collection is acknowledged to be unique as regards the varieties and aberrations it contains. It has been amassed during the past sixty years, and was considerably enriched by the incorporation therein of the collection formed by the late Alfred Owen, who made variety and aberration his special study when scarcely any attention was paid to this subject by others. Some four years ago, thinking that there might be a possibility of the collection being dispersed at some future period, Mr. Capper applied to Mr. S. L. Mosley, the well-known naturalist and natural history painter, to ask if he would undertake to depict those of his varieties which are of special note. This Mr. Mosley kindly consented to do, and these coloured drawings, to the number of about four hundred, were also exhibited, as well as many curious and valuable works on Entomology from Mr. Capper's library. Miss Capper, as hostess, assisted her father in entertaining the guests; splendid weather adding to the surroundings, the members thoroughly enjoyed their visit.

Birmingham Entomological Society.—*June* 18*th*, 1900.—Mr. A. H. Martineau in the chair. Mr. R. C. Bradley showed a piece of wood with borings, taken from a paling at Selsley, Glos., at Whitsuntide, from which he was breeding beetles of a species of *Clytus* which had been noticed to be common in the neighbourhood of the paling. Mr. A. D. Imms, two unusually small female specimens of *Euchloë cardamines*; one from Hall Green, near Birmingham, measured only $1\frac{1}{4}$ in. in expanse; the other, from Hay in S. Wales, measuring $1\frac{1}{3}\frac{1}{2}$ in. Mr. A. H. Martineau, a series of the uncommon ant, *Leptothorax acervorum*, from Selsley, where he had found a small colony; also a black variety of *Formica rufa*, taken on April 22nd, 1900, in the company of ordinary specimens, at Haywood.—Colbran J. Wainwright, *Hon Sec.*

RECENT LITERATURE.

A Natural History of the British Lepidoptera. By J. W. Tutt, F.E.S. London: Swan Sonnenschein & Co., Paternoster Row. Berlin: Friedländer & Sohn, 11, Karlstrasse.

The second volume of Mr. Tutt's great work fulfils the promise of the second, and indeed supplies some chapters which were wanting to complete matters of a general character. That most striking of all the attributes of insects, metamorphosis, is in this second volume treated at length, the observations and theories of the well-known leading authorities on the subject being stated and discussed with especial reference to the many recent contributions to the knowledge of it by Dr. Chapman, to which great prominence is given, and whose views are generally adopted by Mr. Tutt. There is a separate chapter on phenomena incidental to metamorphosis, such as the passing sometimes of several years in the pupal stage, and the impossibility in such cases of forcing. The external morphology of the pupa has a chapter to itself, the author correcting some common errors as to the structure and significance of the different parts, and setting forth the view that the pupa is the (modified) representative of the ancestral form of the insect, from which the larva on the one side, and the imago on the other, have been developed. Professor Poulton's views are discussed very fully, and in some cases combated. Many interesting questions are treated in a separate chapter on the internal structure of the pupa, including the formation of the wings and of the scales upon them. The chapter on the phylogeny of the lepidopterous pupa is by Dr. Chapman, whose previously published writings on the subject are well known, and it is unnecessary to say that it is characterised by great fulness of original observation and carefully thought-out conclusions.

The introductory chapters noticed occupy as far as the hundredth page; the rest of the volume, comprising 467 pages, is taken up with descriptions of species and all that belongs to them in the same copious style as in the first volume. Over three hundred of these pages are occupied with the superfamily of the Psychides, that strange tribe with the extraordinary females—fleshy bags—to our eyes singularly repellent and even loathsome, but most fascinating and attractive to their gay and active partners. There is no accounting for tastes, especially where sex comes in. These three hundred pages present all that is known of the British species, with very full references to many others, and a complete catalogue of the species of the Palæarctic region. Vast labour has been devoted by the author and his coadjutors to this part of his work, a study of which is indispensable to all who desire to be fully informed on this obscure and difficult subject.

The rest of the volume is occupied with a portion of the "Lachneides," which many will know better by the older name of the Lasiocampidæ, or, as Stainton called them, the Bombycidæ, the woolly brown moths with large and beautiful caterpillars, which are the delight of young collectors and breeders. The present volume takes in our old and familiar friends the "December moth" (*Pœcilocampa populi*), *Trichiura cratægi*, the "small eggar," *Lachnis* (*Eriogaster*) *lanestris*, and the "lackeys," *Malacosoma* (*Clisiocampa*) *neustria* and *castrensis*.

The volume is completed by that great desideratum, a full index, and there are several plates. To some of these no exception can be taken, but we cannot say this of the plate opposite p. 73, the process adopted in which is not sufficiently delicate for its object. The phylogenetic tree at p. 462 is not pretty, but serves its purpose. We would venture to suggest that in the forthcoming volumes, to which we look forward, there should be a table of contents, naming the species treated of.

It may seem a little ungracious to find any sort of fault—although only in matters of very minor importance—in this most valuable work; our excuse must be that we wish to render it even more so.

With this we must for the present conclude. Nothing but a lengthened study, such as there has been no time to give it, could do justice to the work; and when we think of the amount of attention necessary to assimilate its contents, we are filled with admiration of the labour that must have been devoted to its production.

F. M.

T. H. Montgomery. *Note on the Genital Organs of Zaitha* (American Nat., 1900, XXXIV., pp. 119–21, 2 figs.). [Rhynchota.]

The author states that an examination of the male genital organs of *Zaitha* showed him that they were very different from those of *Belostoma*, as described by Leidy.* In the females the two genera are quite similar, but in the males each testis consists of a single convoluted follicle (or "capsule") in *Belostoma* [sec. Leidy], while in *Zaitha* each testis is a large organ composed of five follicles, each of the latter thickened anteriorly, the posterior three-fifths forming a narrow tube.

Mr. Montgomery is inclined to lay great stress on these alleged differences for taxonomic purposes, but as he was unable to procure *Belostoma* for practical study, and relied entirely on Leidy's descriptions and figures, it will be well to suspend judgment until a comparative examination can be made. The two genera are certainly extremely closely allied in their external characteristics.

G. W. K.

The following have also been received:—

Proceedings of the Eleventh Annual Meeting of the Association of Economic Entomologists (U. S. Department of Agriculture, Division of Entomology. Bull. 20, n. s.). P. 112. Washington, 1899.

Preliminary Report on the Insect Enemies of Forests in the North-West: an Account of the Results gained from a Reconnaissance Trip made in the Spring and Early Summer of 1899. By A. A. Hopkins, Ph.D. (U. S. Dep. Agr., Div. Entom. Bull. 21, n. s.). Pp. 27. Washington, 1899.

The Coccid Genera Chionaspis and Hemichionaspis. By R. A. Covley, B.Sc. (Special Bulletin, Hatch Experiment Station of the Massachusetts Agricultural College). Pp. 57. Plates i–ix. Amherst, Massachusetts, 1899.

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* 1847, J. Ac. N.S. Philad. (2), I. pp. 57–67. I have retained Montgomery's nomenclature, but Montaudon has lately shown (1900, Bull. Soc. Sci. Bucarest IX., nos. 2 & 3, p. 9) that *Belostoma*, Latr. = *Zaitha* auct., and that *Amorgius*, Stål, Montaudon = *Belostoma* auct.

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A BUTTERFLY HUNTER'S HOLIDAY.

By E. G. Alderson.

Entomology, like several other things which were once regarded as amusements, has now become a very serious and scientific business; but there are still many people who are content to be mere collectors, and to such the New Forest is a never-failing centre of attraction. To step down upon the familiar platform at Lyndhurst Road is like entering on enchanted ground, where all sorts of pleasant anticipations at once arise, and we are filled with the hope of again seeing *Apatura iris* and *Limenitis sibylla* on the wing, if only the weather—rather dubious to-night—will keep fine; all the more delightful if the collector has not been upon the classic ground for two or three entomologically barren years, relieved only by a day's hunt after *Papilio machaon* in its somewhat dreary fastnesses at Wicken Fen. One's first capture of that noble butterfly is a delightful experience, but it cannot give Wicken the glamour of the Forest, and it is pleasant to set foot again in a good land—a land of trees and bracken, of scented pine and wild honeysuckle—even though it be a place where "swallow-tails" are not.

Alas for the weather—that one uncertain element in the prospect—on the evening of July 2nd, when, full of such hopes and anticipations, I got out at Lyndhurst Road. The morning of the 3rd broke dark and rainy, and the march through the woods to Brockenhurst was no cheerful undertaking. The trees looked dismal as sodden umbrellas; the woodland drives were hopeless sloughs of yellow mud. The spiritless fluttering of washed-out "meadow browns" deepened rather than relieved the gloom of the weeping day. Where were the swarms of *Argynnis paphia* which are wont to brighten the woods? Where, too, was *L. sibylla?* A few stragglers of the latter species presently appeared, but not to advantage. It was not the weather to make them sail about with that inimitable languorous grace which they display in the sunshine; they merely fluttered uneasily round the tops of the hollies and settled down again, heedless of clods and other incitements. We ploughed, almost literally, through Stubby Copse, and saw a few *Hesperia sylvanus*, evidently just out, bright as gold, and caring little for the reeking moisture. Met a coleopterist, who thought he had seen *A. iris*. With this doubtful encouragement we emerged upon the Brockenhurst Road, and were at once favoured with a gleam of sunshine and the capture of *A. aglaia*, always a lovely species, and doubly welcome after the morning's experience. Brockenhurst Station at last, and on the platform a group of porters holding an inquiry upon a huge and disreputable *Smerinthus populi*, which had been caught napping on the palings. After lunch we returned by train to Lyndhurst Road, where an hour of sunshine was fruitlessly spent in looking for *Melanargia galatea*. Its favourite riding near the station was quite deserted, and I am told it has completely disappeared from this locality.

Fortunately, the spell of bad weather came to an end that night, and next day, and for very many days after, there was glorious sunshine. The forest began to look more like itself with a few *A. paphia* out for their first flight, and the "white admirals" showed themselves more freely. They were still, however, far from common, though the few specimens that appeared were exquisitely fresh. Those who do not breed *L. sibylla* can seldom see it in perfection. The deep soft black, which is its principal charm, gets rusty very soon by exposure to sun and rain. On the heaths *Polyommatus ægon* was out in great numbers. Still, it was quite clear that I was too early for most things, the season being unusually backward. A couple of nights' sugaring, from which I returned empty, save for one *Leucania turca* and a few *Calligenia miniata*, convinced me that I had better employ myself elsewhere for a time, and leave the forest to develope its entomological resources in peace against my return.

Accordingly I went down to Bournemouth, and began to prospect for insects around Swanage—always a likely place for other things besides *H. actæon*. *M. galatea* was the first to appear, and after failing to find it in its old quarters at Lyndhurst, I was glad to get a few choice specimens. In a day or two after my first visit this butterfly was prodigiously abundant, and it was possible to take any quantity of both sexes. But, quite apart from any question of needless waste, the pleasure of catching *M. galatea* soon palls. It may be magnificent, for beginners, but it is not sport, for the insect is hardly, to say the least, a spirited flyer. Such an easy prey is demoralising, and when presently *Colias edusa* went past like a rocket, I was not in the least surprised at missing him by several yards. It was no surprise, either, on reaching the *H. actæon* locality, to see more than one green net moving about in the scrub below the cliffs. I wonder if on any fine day during July and August one could find this particular spot empty of collectors. Were I a sporting character, I would far rather put my money on the chance of finding *H. actæon* hunters here, than on that of taking the brisk little butterfly itself. Well, there is plenty for all, and the skippers will last our time and perhaps longer—as long, I am inclined to think, as that rugged cliff-face retains its steep and treacherous character.

H. actæon was out, but not in great numbers, and the females were only just beginning to appear. On the other hand, *H. linea* was extraordinarily abundant, which I have noticed on former visits is never the case when *H. actæon* is fully out. *A. aglaia* was plentiful here, but almost impossible to catch, and before leaving the neighbourhood I saw *C. edusa* again, twice. The first specimen was seen on July 10th, rather early in such a backward season. It was a fine fresh male. A few *P. agestis* and *P. argiolus*, with *Satyrus semele* (just out, in splendid condition), were the only other noticeable butterflies seen.

I returned to the New Forest on July 20th, and found the entomological situation considerably changed by the fine weather. On my first visit I could find no var. *valesina*. This time I had not been in the woods ten minutes before I got one, but to my surprise this, and nearly every other specimen I caught—about a dozen in all—appeared to be torn and battered, and not worth keeping. It was the same story with *L. sibylla*, which was now out in countless numbers. Nearly all were partial or total wrecks. Ten days before one of these insects was not out at all, and the other was only just coming out. Their bad condition was hard to explain. Perhaps the wonderful sunshine had tempted them to take an unusual amount of exercise, and in that case the preference they both display for holly bushes and brambles would account for their exceeding shabbiness. I may remark that in many previous visits to the forest I have never found *valesina* so scarce as it was this season.

Hearing rumours of another and more serious failure—the non-appearance, up to date, of *Catocala promissa*—we did not go out sugaring at first, but contented ourselves with the butterflies: there were plenty of them. *Thecla quercus*, as usual, was present in myriads, and, as usual, there was hardly a decent specimen to be got. One very hot day brought forth a regular invasion of *Gonepteryx rhamni*. Twenty-four hours previously not one could be seen, but in the interval they arrived unmistakably. Their abundance was really extraordinary. *Vanessa polychloros* was also in great force. I suppose I ought to be ashamed to confess that, even after a fairly long collecting experience, the sight of *polychloros* always makes me eager to catch him. He is a most tempting insect, with his large size and gorgeous colouring, as he sits lazily expanded on the end of a twig or on the sunny side of a paling; a most sporting insect, too; a regular dodger, hard to catch by reason of his floppy tumbling flight, and tantalising withal, inasmuch as when caught he is nearly always snipped or rubbed, so that each successive specimen you see—and miss—seems finer than any you already possess.

But there was nobler game abroad in the forest, and if I had not been very much abroad also, I should have had several head of it. In one of those unhappy moments which come to entomologists as well as to other people, when you feel inclined to wish that the earth would open and swallow you, I missed a sitting shot at a grand *Apatura iris* that let me get within a yard of it, while I was beating up a patch of bracken. I had other chances—and missed them—but this was the chance of a season. There were many *A. iris* about, but the great heat seemed to make them lazy, and the most they would do was to take a leisurely turn round the tree tops, well out of reach of the net.

Moths were not a serious object, but I made one final sugaring expedition, when the local collectors had almost come to despair of *C. promissa*, and had the pleasure of opening the long-deferred season by the capture of three fine "crimsons." We also took *Triphæna fimbria* and one enormous *Cossus ligniperda*. But sugaring in our time was not a success. I can only hope that later arrivals have been more successful. Moths beaten out in the daytime included *Liparis monacha* and *Lithosia quadra*. The latter species has been very abundant in the forest this year, and once or twice I saw the female flying in bright sunshine. On the whole, the season seems a good one, and I expect to read many favourable reports from collectors who have bided their time and then made the most of it. I cannot with a clear conscience say that I did either; but though my list of captures left much to be desired, I shall always remember with pleasure my visit to the forest in the glorious weather of July, 1900.

Pampisford Vicarage.

NOTES ON *TRIECPHORA SANGUINOLENTA*, MARSH., EDW.

By Rev. F. A. Walker, D.D.

Triecphora vulnerata, Illiger; *Cercopis vulnerata*, Illig., Curtis; *C. sanguinolenta*, Panz., Burm.

This very handsome species of British Cicada is sure to attract attention wherever noticed, being tropical or semi-tropical in appearance, and not resembling any of its English congeners or any ordinary English insect, with the possible sole exception of its wing-cases bearing a likeness to the fore wings of *Zygæna* *filipendulæ.* My object in writing this notice is to add another county to the localities already quoted in connection with this species. Between 12 and 1 p.m. on Saturday last, June 9th, while working with the net in a lane up a somewhat steep slope on the south side of the railway station of Chorley Wood, Bucks, I noticed one in the hedgerow, but I most unfortunately missed securing the same, which must have dropped from the leaf into the grass beneath. A few minutes later, I was presented with a second by a resident in one of the new villas in the neighbourhood, and on our return the researches conducted jointly by two juvenile scientists who acccompanied me, and myself, resulted in the capture of ten additional specimens. So far as my observation went, this species appears especially to favour the twigs and leaves of hazel and alder. I had never previously come across this insect in Britain, but, on referring to my collection of foreign Hemiptera, have to record the following captures that I made abroad of this species:—Aceldama, April, 1882 (Palestine); Ephesus, May, 1882 (Asia Minor); Langaron, May, 1891 (South of Spain).

I have also been given a continental specimen or two (one of them from Leghorn) by a brother entomologist. My specimens from Aceldama (always supposing that they represent the same species of *Triecphora*) are somewhat differently marked, having a larger proportion of black in comparison of the red. Other English localities and counties where the above insect occurs will be found on p. 81 of vol. i. of Buckton's 'British Cicadæ,' and in Edwards's 'Hemiptera-Homoptera of the British Islands,' 1896, pp. 77, 78. The latter author records it on alder and sallow, also on grasses and *Pteris.* Buckton speaks of it as near alder bushes. My father, on p. 668, vol. iii. of 'List of Homopterous Insects in Collection of British Museum, 1851,' gives the following localities for this species:—England, France, South of France, Spain, Turkey. As he styles var. *a* of Burmeister *Cercopis atra* (Herrich-Schaff.), and var. 1 *nigra* (Amyot), it is possible that the darker specimens I took at Aceldama belong to one or other of said varieties. According to my father's catalogue there are nineteen species of *Triecphora,* but only three of them European. In the interleaved manuscripts of his book, four European species described by Fieber are recorded—*T. vulnerata, mactata, arcuata,* and *sanguinolenta;* but according to my father's printed list, the 1st, 2nd, 4th—*vulnerata, mactata,* and *sanguinolenta*—are synonyms for one and the same kind, as indeed the meaning of those words testifying to its appearance would seem to imply.

Dun Mallard, Cricklewood: June 12th, 1900.

BIBLIOGRAPHICAL AND NOMENCLATORIAL NOTES ON THE RHYNCHOTA. No. 1.

By G. W. Kirkaldy, F.E.S.

These notes will serve as a commentary, to some extent, on the "Nomenclature of the Genera of the Rhynchota" now appearing serially in the 'Entomologist.'

I wish, first of all, to modify "method" No. 3 (*l. c.*, 1900, p. 26). After considerable correspondence with my friend Mr. L. B. Prout, who is making similar studies upon the nomenclature of certain Lepidoptera, I have come to feel with him that a more logical method is to work out each genus independently. Fabricius was ignorant of (or ignored) Latreille's work published the previous year, and there is no doubt that the genera are coextensive and practically identical. I have not, therefore, adopted the usual plan, in such a case, of fixing the remaining (or one of the remaining, if there are more than one) species as the type of the other genus.

1762. Geoffroy's 'Histoire abrégé' has been placed by Reuter (in his 'Revisio') among the non-Linnean works, *viz.*: 'Arbeiten in welchen die binäre nomenclatur nicht durchgeführt ist.' I have but little to say on this point, except that if such genera as those in Latreille's "Précis"—*Pentatoma*, Oliv., *Cylindrostethus*, Fieber, &c.—are to be (as they are apparently universally) accepted, it is not logical to refuse admittance to Geoffroy's work, which was, generally speaking, far more scientifically conceived and accurate than almost any other entomological work of his century. He himself was certatnly under the impression that his work was based on Linné's system, for which he expressed the greatest admiration.* His genera are clearly defined, and in all the Linnean species redescribed Linné's nomenclature is adjoined. It appears to me quite logical to quote his "Grande Punaise à avirous" (for instance) as "*Notonecta glauca*, Linn., Geoffr., 1762, Hist. abr. i. 476." In 1764, O. F. Müller (Ins. Fridrichsdal.) confirmed all Geoffroy's Rhynchota genera, except *Tetigonia*, which he seems to have overlooked.

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* "Cependant l'histoire des . . . insectes est restée jusqu' à nos jours dans cette espèce de confusion et c'est à M. Linnæus, cet infatigable Naturaliste Suédois, que nous devous le premier Ouvrage methodique sur cette matiere . . . si son Ouvrage est encore eloigné de la perfection au moins doit on lui savoir gré d'avoir montré la route qu'il faut suivre" ('Discours Preliminaire,' p. x).

"A l'aide d'un ordre méthodique, nous pratiquerous la même chose sur les insectes . . . et l'on pourra trouver le nom et l'espéce d'un insecte inconnu auparavant" (*l. c.*, xii).

"Nous sommes donc infiniment redevables à M. Linnæus d'avoir cherché le premier à ranger méthodiquement les insectes, et à trouver des caracteres génériques qui les fissent plus aisément connoitre" (*l. c.*, xiii), &c.

1825. The exact date of publication of the tenth volume of the 'Encyclopédie méthodique' and of Latreille's 'Familles naturelles' is uncertain; but, from internal evidence, pp. 1–325 of the former were apparently published before, and pp. 326 to the end, after, the appearance of Latreille's work. *Reduvius cruciatus* is fixed for the type of *Ectrichodia* for the following reason, *viz.*, seven species are mentioned, but in the individuals of one only (*cruciata* = *crux*, Thunb.) were the full number of antennal segments present, and this is specified in the generic description: "S'il nous eût été possible de verifier les antennes de plusieurs especès, nous n'aurions par hésité à proposer cette subdivision comme genre sous le nom d'Ectrichodie (*Ectrichodia*), mais nous ne les avons complètes que dans une seule espèce."

1835. Lewis, in Trans. Ent. Soc. i. pp. 47–52. This paper is usually quoted "1836"; but Burmeister states that it was published in 1835 (Arch. f. Naturg. 1836, ii. pt. 2, p. 327).

1843–4. Guérin-Méneville's 'Iconographie' (Insectes) is dated 1829–38; the date of the Rhynchota part is, however, 1843–4. On p. 352 (in the same part as p. 343, on which the Rhynchota begin) is written: "Nous avous publié dans la 'Revue Zoologique de la Société Cuvierienne,' 1843," &c.; and on p. 381 ("error," 831) the author states that Amyot and Serville's 'Suites à Buffon, Hemipterès' (pub. 1843), is "actuellement sous presse." Pp. 369–81 may have appeared very early in 1844, as the author subscribes the date of writing (p. 385 in the same part) as "Décembre, 1843." Although dated 1843, Amyot and Serville's work may have actually appeared in 1844.*

1834. Reuter (Revisio Syn. 1888) incorrectly assigns *argus* (= *malabaricus*) as type of *Asopus*, Burm. This genus was founded in 1834, in Rev. Ent. ii. 1–26, for two species, viz., *gibbus* (= *cayennensis*) and *dianæ* (= *anchorago*), which cannot be generically separated (sec. auctt.) from the types of *Discocera*, Lap., and *Stiretrus*, Lap., respectively. Burmeister states that this part of the Rev. Ent. was published before his contribution to Meyen's 'Reise' (*vide* 'Handbuch,' ii. 349): "Ich. habe den von mir vorgeschlagenen (in nov. acta. phys. med. vol. xvi. suppl. p. 418) Gattungsnamen beibehalten . . . Früher" (in Silbermann's 'Revue,' ii. 19)," &c.

"*Kleidocerus*, West. Hope Cat. 1842," is erroneously quoted (Lethierry and Sev. Cat. ii. 158) as a synonym of *Ischnorhynchus*. The former name does not occur in the Hope Catalogue, and I cannot find that it was ever described. It was undescribed, as "*Kleidocerys*," in Stephens' Catalogue, 1829, and in Westwood's "Introduction," Gen. Syn. 123 (1839).

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* The plates of this work were, in part at least, issued about 1834, for Burmeister quotes them (1835, Handb. Ent. ii. p. 152), and some are dated 1834.

NOTES ON LETHIERRY AND SEVERIN CAT. VOL. I. (1893).*

Pp. 1 & 2. The first description of *Aphanopneuma biloba* and *Cantharodes cænosa*, Westwood, appeared in 1846, under the generic name of *Plataspis*, the subgenera being indicated, but not described till 1847.

P. 1. The specific reference to *Ceratocoris bucephalus*, White, is correct; but the genus was not named nor described till 1842. Trans. Ent. Soc. Lond. iii. 84.

P. 18. **Scutiphora*, Guér. Coquille, 1830–1 = *Peltophora*, Burm.

P. 83. *Dryptocephala*, Lap., 1832 = **Storthia*, Perty, 1834. Delect. p. 215 (type of *Storthia* is *Phlæa livida*, Perty; p. 168 [nec 169 as in index] = *Storthia livida*, *l. c.*, p. 215).

P. 105. *Stenotoma*, Westw., was first described, with its type, in Proc. Ent. Soc. Lond., 1844, p. cxix (reprint, 1864, p. 99).

P. 119. *Rhytidolomia*, Stål, 1872 = *Pentatoma*, L. & S. = *Lioderma*, Uhl. (preocc. Mars., 1857) = *Chlorochroa*, Stål, 1872. Type *senilis*, Say.

P. 183. Delete "*Pentatoma*, Linné," &c. !!

P. 202–20 (see above, re *Asopus*). *Discocera*, Lap. = *Asopus*, Burm. (p.); *Stiretrus*, Lap. = *Asopus*, Burm. (p.); *Amyotea*, Ellenrieder = *Asopus*, Leth. & Sev.

P. 224. *Agapophyta*, Guér., 1830–1, is wrongly attributed to Laporte.

P. 239. *Megymenum*, Guér., 1830–1, is wrongly attributed to Laporte.

P. 240. The original description of *Eumenotes* (and its type) was in Proc. Ent. Soc. Lond., 1844, p. cxv (reprint, p. 95).

P. 243. The correct spelling is *Schyzops* (see p. 297, Spinola).

P. 224. *Oncomeris flavicornis*, Guér., 1830–1, is wrongly attributed to Burmeister, 1835.

NOTES ON VOL. II. (1894).

P. 20 (α). *Acanthocerus*, Pal. B., 1805 [not preocc., as saith Burm.] = *Crinocerus*, Burm. Type, *sanctus* (Fabr.), Lap.

(β). *Hymeniphera*, Lap. = *Hymenophora*, Am. Serv. = *Acanthocerus*, L. & S. Type, *crucifer* (Pal. B.), Lap.

P. 42. *Lybastes*, *n. n.* = *Lybas*, Dall. (nec Chev., 1834). Type, *annulipes*, Dall.

P. 77. *Acanonicus*, Westw., Hope Cat. ii. p. 3 (1842). This reference, I think, stretches the meaning of "reference to a previously described genus or subgenus" to its farthest limits. Westwood simply substitutes "*Acanonicus*" for "*Spartocerus*, b. Burm."; but as the section "b" is based on structural characters, it may perhaps pass muster.

P. 95. **Coriomeris*, Westw., *l. c.*, p. 6 (1842) = *Merocoris*, Hahn (1831, nec descr.), 1834 (preocc., Perty, 1832) = *Coreus*,

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* An asterisk (*) before a name signifies that it is omitted in Lethierry and Severin's Catalogue, vols. i.–iii.

L. & S. (nec Fabr., typ.). Type [*pilicornis*, Klug. =] *denticulatus*, Scop.

P. 128. *Berytinus*, *n. n.* = *Berytus*, L. & S. (nec Fabr., typ.) = *Neides*, L. & S. (nec Latr., typ.). Type, *clavipes*, Fabr.

P. 150. *Lygæosoma sardea*, Spin., 1837 = *reticulata* (H.-S., 1838).

P. 165. *Blissus*, Klug, 1830, nec 1845.

P. 190. *Chiroleptes*, Kirby, 1837 = *Myodocha*, L. & S. (nec Latr., 1807).

P. 205. *Plinthisus*. I have been unable to find a reference to this in Latreille, Gen. Crust Ins. iii.

P. 214. *Aphanus*, Lap., 1832 = *Calyptonotus*, D. & S., 1865. Type, *roland*[*r*]*i* (Linn.).

NOTES ON VOL. III. (1896).

Pp. 7 & 8 (α). *Dictyonota*, Curt. = *Scraulia*, Stål. Type [*eryngii*, Curt., nec Latr. =] *strichnocera*, Fieb.

(β). *Alcletha*, *n. n.* = *Dictyonota*, L. & S. (nec Curt., typ.). Type, *tricornis*, Schranck. [= *crassicornis*, Fall., L. & S.].

P. 9. *Coleopterodes*, Phil., 1864 = *Solenostoma*, Sign. (nec Raf., 1815).

P. 29. *Macrocephalus*, Swed. = **Macrothyreus* (subg.), Westw. Trans. Ent. Soc. Lond. iii. p. 28.

P. 41. *Dysodius lunatus* (Fabr.)=**lunulatus*, Lep., Serv., 1825.

P. 51. *Næogeus*, Lap., 1832 [nec *Næogæus*] = *Hebrus*, Curtis, 1833.

P. 62. *Cylindrostethus productus* (Spin.) = *Gerris producta*, Spin., 1837, L. & S. p. 62 = *Hydrobates fieberi*, L. & S. p. 63.

P. 96. *Physoderes*, Westw., 1844, Proc. Ent. Soc. Lond. p. cxv (rep. p. 96) = *Epirodera*, Westw., 1847.

P. 103. *Tetroxia*, Am. Serv., 1843 = *Acanthaspis*, 1843.

P. 112. *Sorglana*, *n. n.* = *Macrophthalmus*, Lap., 1832 (nec Latr., 1829) = *Macrops*, Burm., 1835 (nec Perty, 1832). Type, *pallens*, Lap.

P. 113–14 (α). *Tapeinus*, Lap., 1832 = *Opinus*, Lap., 1832 = *Tapinus*, Burm., 1835 = *Sminthus*, L. & S. Type, *pictus*, Lap.

N.B. *Opinus* is only mentioned in the analytical tables.

(β). *Staliastes*, *n. n.* = *Opinus*, Stål. (nec Lap., typ.). Type, *rufus* (Lap.) Whether *Tapeinus* or *Opinus* be ultimately preferred for *pictus*, neither of these generic names can be used for *rufus*, for this species was included with doubt by Laporte in his *Tapeinus*.

P. 116. *Triatoma*, Lap., 1832 (not preoccupied) = *Conorhinus*, Lap., 1832. *Triatoma* ought to have precedence.

Pp. 133, 137, & 139 (α). *Rhiginia*, Stål., 1859 = *Ectrichodia*, L. & Sev.

(β). *Loricerus* (Hahn), Burm. = *Larymna*, Stål, 1859. = *Ectrychotes*, Leth. & Sev. Type, *hæmatogaster*.

(γ). *Ectrichodia*, Lep. & Serv., 1825 = *Ectrychotes*, Burm., 1835 [= *Loricerus*, Hahn (p.), nec descr.] = *Physorhynchus*, Leth. and Sev. Type (*cruciatus*, Lep. & S. =), *crux*, Thunb.

N.B. *Ectrychotes* was simply an "emendation" (sic!), and cannot be used otherwise than as a pure synonym of *Ectrichodia*.

P. 135. *Castra*, *n. n.* = *Cimbus* (Hahn), Burm., 1835, L. & S., nec Laporte, 1832. Type, *productus* (Hahn).

P. 151 (α). *Zelus*, Fabr. = *Euagoras*, Burm. (nec *Evagoras*). Type of latter, *speciosus*, Burm.

(β). *Diplacodus*, *n. n.* (subg.) = *Diplodus*, Am. Serv. (nec Raf., 1815).

Pp. 157–95 (α). *Rhynocoris*, Hahn (Nov., 1833) = *Harpactor*, L. & S. Type (*cruentus*, Fabr. =) *iracundus*, Poda.

(β). *Harpactor*, Lap., 1832 = *Sthienera*, L. & S. Type, *angulosus* (Lep. Serv.), Lap., Essai, 1832, pp. 8 and 88.

P. 184. *Darbanus*, Am. Serv., 1843 = *Euagoras*, L. & S. (nec Burm., typ.).

P. 202. *Nabis*, Latr., 1802 = *Prostemma*, L. & S. Type, *guttula* (Fabr.), Latr., 1804.

P. 207. *Reduviolus*, Kirby, 1837 = (subg.) *Nabicula*, Kirby, 1837 = *Aptus* (Hahn, nec descr.), Stål. = *Nabis*, L. & S. Type, *inscriptus*, Kirby.

P. 226. *Leptopus*, Latr. Consid. gén. (1810).

P. 237. *Dolichomerium*, *n. n.* (subg.) = *Dolichomerus*, Reut. (nec Macq., 1850).

MISCELLANEOUS NOTES.

Colgar, *n. n.* = *Atella*, Stål. (nec Doubl., 1847). Type, *peracuta* (Walk.).

Darthula, *n. n.* = *Urophora*, Westw. (nec Desv., 1830). Type, *hardwickii*, Westw.

Cicada aurifera, Say, 1832 = *marginata*, Say, 1832 (nec Oliv., 1790).

Thaumastopsaltria, *n. n.* = *Acrilla*, Stål (nec Adams, 1860). Type, *adipata* (Stål).

Tongorma, *n. n.* = *Craspedum*, Am. Serv. (nec Ramb., 1838–42). Type, *phyllomorphum* (Latr.).

Tonga, *n. n.* = *Cyrene*, Westw. (nec Heck., 1840). Type, *guttulata* (Westw.).

Zoraida, *n. n.* = *Thracia*, Westw., 1840 (nec Blainv., 1825). Type, *sinuosa* (Boh.).

Phoronastes, *n. n.* = *Phoroneus*, Stål (nec Raf., 1815). Type, *crassifemur* (Stål).

Sronachlachar, *n. n.* = *Aleria*, Stål (nec Marsh., 1874.) Type, *asopoides*, Stål.

**Leptomeris picta*, Lap., Essai, 1832, p. 10, from Paris. What is the modern synonymy of this genus and species, apparently not included in Puton's nor in Lethierry and Severin's Catalogues? The generic name is preoccupied by Hübner, 1816.

Edwardsiastes, *n. n.* = *Glyptocephalus*, Edw. (nec Gotts., 1835). Type, *proceps*, Kirschb.

Proranus, Spin., 1850 = *Epiclines*, Am. Serv. (nec Guér., 1838).

Balclutha, *n. n.* = *Gnathodus*, Fieb. (nec Pand., 1856).

Hindola, *n. n.* = *Carystus*, Stål (nec Hübn., 1816). Type, *viridicans* (Stål).

Jamaicastes, *n. n.* = *Domitia*, Stål (nec Thoms., 1858). Type, *basistriella* (Walk.).

Krisna, *n. n.* = *Siva*, Spin. (nec Hodgs.). Type, *Strigicollis* (Spin.).

Lydda, Westw., 1840 = *Diospolis*, Westw., 1841. Type, *elongatus* (Fabr.).

Kalidasa, *n. n.* = *Phoronis*, Stål (nec Wright, 1857). Type, *sanguinalis* (Westw.).

Hilda, *n. n.* = *Isthmia*, Walk. (nec Gray, 1821). Type, *undata* (Walk.).

Flosshilda, *n. n.* = *Autonoë*, Stål (nec Bruz., 61). Type, *albigera* (Stål).

Phorastes, *n. n.* = *Phorus*, Stål (nec Montf., 1810). Type, *femoratus* (DeGeer).

Zyzza, *n. n.* = *Germaria*, Lap. (nec Desv., 1830). Type, *cucullata* (Lap.).*

I have not seen, nor have I been able to obtain accurate information regarding, Hahn's 'Icones ad monogr. Cimicum,' 1826. There were apparently twenty-four plates, but only one page of letterpress, so that the genera were probably not defined. The following appear to be at least named in this work, viz.:—*Globocoris*, *Pilophorus*, *Centroproctus*, *Hypselonotus*.

SOME BEES VISITING THE FLOWERS OF MESQUITE.

By T. D. A. Cockerell, N. M. Agr. Exp. Sta.

The bees here enumerated were collected by Miss Nora Newberry at the flowers of mesquite (*Prosopis glandulosa*, Torrey) at Mesilla Park, New Mexico, May 20th, 1900. It is an indication of the richness and variety of our bee-fauna, that even after so many years of collecting by the present writer in the immediate vicinity, two of the species are new.

(1.) *Centris rhodopus*, Ckll., three males.
(2.) *C. lanosa*, Cress., one male.
(3.) *C. hoffmanseggiæ*, Ckll., one female, four males.
(4.) *Anthidium paroselæ*, Ckll., five males.
(5.) *Megachile chilopsidis*, Ckll., one female.
(6.) *M. cleomis*, subsp. *lippiæ*, Ckll., two females.
(7.) *M. sidalceæ*, Ckll., one female.

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* Subgenus (?) of *Tetigonia*, Geoffr.

(8.) *Megachile newberryæ*, n. sp., one male.

Length 13 mm., form of *M. fidelis*, but differing from that species as follows :—Pubescence white, that of face and abdominal bands pure shining white; a little black hair on each side of the middle of the mesothorax, but none on the scutellum, vertex, or first three abdominal segments; fourth segment with very short erect hair, mixed dark and light; fifth segment with abundant long black bristles; vertex microscopically tessellate, dull, with sparse shallow punctures (in *fidelis* it has strong close punctures); mesothorax and scutellum sculptured like the vertex; wings clear, with an apical cloud, stigma very dark ferruginous, marginal cell considerably shorter than in *fidelis;* end of abdomen in lateral profile like *fidelis*, but apex, instead of having a small deep notch, with a broad shallow very jagged emargination; anterior tibiæ black; anterior tarsi with the process of the first joint cream-colour, deeply hollowed, shaped as in *M. pugnata*, but broader, and not quite so produced at the tip; remaining joints of anterior tarsi cream-colour, but the other tarsi black; spines of anterior coxæ long, black, blunt, with a prominence about the middle of the outer upper border, whence runs a groove to the tip. The eyes in life are black at the top and sides, otherwise green; antennæ wholly black, last joint slightly broader than the one before; tegulæ dark; fringe of anterior tarsi orange-ferruginous within. This cannot be the male of *M. vallorum*, *populi*, *chilopoidis*, or *prosopidis*, the sculpture of the thorax being entirely different.

(9.) *Lithurgus gibbosus*, Smith, one male.

(10.) *Colletes prosopidis*, Ckll., one male, one female.—The female has not been described; it is about 7½ mm. long, and resembles the male, except in the usual sexual characters. The flagellum, except the first two joints, is light reddish brown beneath; clypeus shining, with strong sparse punctures; no black hair on head or thorax; tarsi very dark brown, penultimate joint of hind tarsi extremely small.

(11.) *Colletes algarobiæ*, n. sp., one male, three females.

♂. Resembles *C. prosopidis*, but is larger, with the very long flagellum only dull brownish beneath, and conspicuously, though very finely, pubescent; second submarginal cell much broader, less narrowed above; enclosure of metathorax with about eight distinct longitudinal ridges, and bounded by a strong single ridge (in *prosopidis* the bounding ridge is generally double). The tarsi are clear bright ferruginous; nervures and stigma very dark brown; malar space but little broader than long.

♀. Length 8½ mm., similar to *C. prosopidis*, but larger; flagellum wholly dark; the white pubescence of vertex, mesothorax, and scutellum (particularly the last) with blackish hairs intermixed; hind margins of ventral abdominal segments whitish hyaline. Wings hyaline, nervures and stigma black; abdomen with distinct and broad white hair-bands; tegulæ shining dark brown; mesothorax rather sparsely punctured; malar space much broader than long. Differs from the female of *texana* by the less conspicuous black hair of thorax, differently sculptured metathoracic enclosure (that of *texana* being divided by the ridges into square portions), and especially by the much smaller and less crowded punctures of the mesothorax.

The specific name is derived from that of the subgenus to which the mesquite belongs. From *C. daleæ* the male differs by the broader and shorter abdomen, dark stigma and tegulæ, &c. The malar space is much shorter than in *daleæ*.

At the same locality, and on the same day, Miss Newberry took six bees at flowers of *Opuntia engelmanni*. These prove to be *Megachile sidalceæ*, Ckll., one male; *Diadasia rinconis*, Ckll., five females.

Mesilla Park, New Mexico, U.S.A.: May 21st, 1900.

THE ANT-HILLS AT THE PARIS EXHIBITION.

By Vivian St. Clare Mackenzie.

Entomologists who pay a visit to Paris during the Exhibition season should not omit to enter the chamber in the Palais des Sciences, where Mons. Charles Janet is showing five artificial ant-hills. The hills are made of pink plaster of a porous nature covered with glass, through which visitors may observe the ants bustling about in the performance of their multifarious duties.

M. Charles Janet has devoted many years to the study of ants, bees, and wasps, and exhibited a similar suite of nests at the International Exhibition at Brussels in 1897. His contributions to the Société Zoologique de France describe observations and experiments extending over a series of years, and those of his brochures which treat of ants are not the least interesting. The ant-hills which he has placed in the Palais des Sciences are constructed after the model of a natural hill in a garden near Beauvois, and contain the following species:—*Formica rufa*, *F. sanguinea* with slaves, *F. fusca*, *Lasius flavus* with *Claviger testaceus*, *L. mixtus* with myrmecophiles, such as *Lepismina polypoda*, *Antennophorus uhlmanni*, *Discopoma comata*, *Lælaps holothyroides*. At the present moment the ants are busily engaged in carrying those of the eggs which almost hatched to the surface, so that the young on making their *début* in this world may see it at its best, and enjoy the warmth and brightness of the sunshine.

It is amusing to watch the audacity of the *Lepismina polypoda*, an inmate quickly distinguished by his extraordinary agility and pale yellow colour. A *Lasius mixtus* returns from his country walk, ambles up to a comrade, and stands *vis-a-vis* preparing to disgorge a little drop of liquid nourishment which he has brought home. The couple are watched. The impudent *Lepismina* rushes forward, hurls himself between the two ants, snaps the *bon-bouche*, and hurries away. Pursuit is futile, for the thief, as his cognomen *polypoda* implies, has many legs, and knows how to use them. But even these gentlemen, who live by taking the bread from the mouths of others, are not the only objectionable characters with which the respectable ant-citizen has to contend. There is the *Antennophorus*. Three of these parasites fasten themselves on the body of the *Lasius*, one on each side of the abdomen, and one under the head, where he has the satisfaction of supervising the dietary of his host. The *Antennophorus* passes easily from one ant to another, always displaying a marked preference for young workers which have not long left the egg; doubtless, as M. Janet suggests, with a view to profiting by the attention bestowed on the latter by their elder companions. If the *Lasius* escapes the *Antennophorus*, he falls a victim to the *Discopoma comata*, in which case one would think that the last state of that *Lasius* was worse than the first; but these ants not only submit to, but treat well, their inevitable *attachés*.

This enviable spirit of philosophy is curiously demonstrated in the artificial nests, where brief observation shows that while the ants calmly tolerate the *Discopoma* which cling to their bodies, they invariably make an infuriated onslaught upon those they find detached on the floor of the nest.

M. Janet had made numerous analyses with a view to determining whether any means of oral communication obtains among ants. That two ants are in the habit of hob-a-nobbing by tapping their heads together, and making movements which appear to be gesticulations, has been observed by Büchner. Landois goes further, and maintains, from experiments with a delicate vibratory instrument placed on the abdomen, that they possess a language of sounds. This theory, although strongly combatted by no less an authority than Sir J. Lubbock, is endorsed by M. Janet, who states that it is certain that, at any rate, the insects produce peculiar grating noises, which are probably due to the rubbing together of their bodies, and that these sounds, cumulatively resembling the noise of boiling water, accompany many of their characteristic movements. It is also certain that ants possess a sense of hearing very highly developed. The question, however, is still of the character of a *lis pendens;* and many who remember to visit M. Janet's ant-hills will have every opportunity and encouragement to investigate for themselves.

26, Montague Place, W.C.

NOTES AND OBSERVATIONS.

Migration of Libellula quadrimaculata. — Part of the migration of *L. quadrimaculata* alluded to by Mr. W. J. Lucas (*ante*, p. 210) evidently reached here. Prior to this year, so far as I know, the species has never been observed in the Huddersfield district; but in June, and up to July 2nd, specimens taken miles apart were brought to me, the last one by some boys near my own residence. — Geo. T. Porritt; Crosland Hall, near Huddersfield, August 10th, 1900.

Halias prasinana audible.—A male of this species was heard distinctly by me the other night at a distance of eighteen feet at least. I took the sound for that of a mouse at first, as it was somewhat similar to that sound. A better description would perhaps be that it resembled the squeak of *Acherontia atropos*, except that it was continuous so long as the semicircular flight of the moth lasted. As the moth turned in its flight the sound stopped. This flight was like that of a *Hepialus* wheeling in half-circles round a bough of an elm, about eight feet from the ground. I suppose many of your readers will have noticed this before; but how is it caused?—R. Freeman; Prescot, Lancs.

Proctotrypids *ex* Lepidopterous Ova. — Referring to Mr. Bird's statement at p. 224, I suspect his "ichneumons" were really members of the Proctotrypidæ, which are the insect-egg devourers *par excellence.* He says the eggs were found upon aspen at Beaconsfield during the first week of July, and emerged *circa* July 21st, 1900. On Aug. 13th, 1899, Mr. H. W. Shepheard-Walwyn, M.A., sent me for identification from Strath-Tay a batch of white eggs with one black vertical spot, each perforated with a more or less regularly circular hole, from which had emerged a single minute hymenopteron (some still alive), of which I carded eleven examples, along with the eggs. There were sixty-six ova, and each one is thus punctured, some of the flies having succumbed in process of exit, which, curiously enough, they *appear* to effect tail first. Mr. Walwyn says he put the eggs down as those of *Notodonta dictæa*, L.; they were upon poplar, so, if he be mistaken, they are probably *N. ziczac*, L. Knowing nothing of the parasites, I subsequently sent them to Rev. T. A. Marshall, in Corsica, who tells me they are referable to Nees's genus *Prosacantha* (= *Teleas*, Walk.), but that the species is probably undescribed; and, further, that there are thousands of these tiny beings (the total length of mine is ¾ mm.; Mr. Bird's must be less) at present undescribed and tabulated. We trust Mr. Marshall will rectify this omission, since no one else can, in his forthcoming volume upon the Proctotrypidæ. I wish, moreover, to enter an apologetic protest against calling the whole Parasite Hymenoptera by the sweeping title "Ichneumonidæ," which is not only incorrect (in more recent entomological times), but also misleading; and I would refer your readers to the didactic table—surely sufficiently comprehensible—at Entom. xiii. p. 27. P.S.—I shall be glad of, and will acknowledge any, Ichneumonidæ sent to me. — Claude Morley; Ipswich.

CAPTURES AND FIELD REPORTS.

Sirex gigas.—A fine specimen of *Sirex gigas* was brought to me on July 20th, having been taken in a shop in this town. This species occurred in the same shop some years ago, and within a few yards of the localities of two other records of the same insect.—(Miss) E. M. Alderson; Worksop.

Libellula quadrimaculata.—On June 10th, between Margate and Broadstairs, I noticed a very unusual swarm of a dragon-fly which I believe to be *L. quadrimaculata*. I think this was the same day that Mr. H. Stocks saw them at Margate. I noticed also that they seemed to be flying inland, and they certainly appeared to increase in numbers towards evening. I managed to net three, and these I have now in my collection.—A. J. Mann.

Black Varieties on a South Lancashire Moss.—Last summer I took an almost uniform dark brown (nearly black) *Macaria liturata* (beaten); also a black *Luperina testacea* at light. Last week I took an almost black *Acronycta leporina* and an almost black *Xylophasia rurea* var. *combusta* (at least that is what I take it to be). Dr. Cotton, of St. Helen's, was with me the night the black *leporina* occurred, and he took a good specimen of *A. alni* the same night. The thorax of the *A. leporina* is quite black, and the fore wings only show the least little trace of grey.—R. Freeman; Prescot, Lancashire.

Papilio machaon in Kent.—On June 10th, about 6 p.m., a friend caught a fine male specimen of *P. machaon* on the border of a cornfield between Broadstairs and St. Peter's. I have never heard of one being caught in these parts before, though it may have escaped from a breeding-cage.—A. J. Mann; Lindenthorpe, Broadstairs, Aug. 13th. 1900.

Papilio machaon in Kent.—It may be of interest for you to know that, while staying at Herne Bay in the middle of May last, I captured a specimen of *P. machaon*, on the wing, in a lane on the outskirts of Blean Woods. The insect was flying slow and apparently with difficulty, and when I took it I found that the tail of one under wing was missing, and nearly the whole of the other under wing completely gone. The colour of the upper wings was good, and might have belonged to a freshly emerged insect.—G. B. Browne; 43, Southbrook Road, Lee, S.E.

Papilio machaon in the New Forest.—I have just seen a fine specimen of this butterfly, bred from a larva taken in a kitchen garden in Lyndhurst. When found the larva was full-fed, and was crawling in a bed of shallots, seeking a place in which to pupate; probably it had fed on carrot, a bed of which is near to the place where it was picked up by the gardener. It pupated July 17th, and the butterfly emerged Aug. 1st. Can anyone say if *P. machaon* has been taken in this neighbourhood since the date given by Newman?—E. F. Chawner; Lyndhurst, Aug. 2nd, 1900.

Cœnonympha pamphilus var.—On June 23rd last I took a specimen of *C. pamphilus* with the eye-spot on the fore wing entirely absent on both sides. The specimen is also very dark, and the veins are black and very distinct; otherwise it is normal. It was taken on a heath within two miles of Poole, Dorset. I have been told that this variety is rather uncommon, and should like to know if it has a name.—C. E. O. Carter; Parkstone, Dorset, July 15th, 1900.

ARGYNNIS ADIPPE IN SURREY.—I believe this insect is generally looked upon as somewhat scarce, but on July 7th I captured six, and again, on July 14th, I took eight more. I saw quite double that number. I found them in a clearing in Worth Forest, taking every one off the blossoms of the black knapweed (*C. nigra*).—HERBERT BEADNELL; Fernside, Redhill, Surrey, July 24th, 1900.

COREMIA QUADRIFASCIARIA AND MELANIPPE PROCELLATA IN ESSEX.—I am able to supplement Mr. Raynor's record of this species in Essex (*ante*, p. 225) by two captures, one in July, 1899, and the other in July of the present year. Both specimens were taken in the grounds of the Countess of Warwick's School at Bigods, near Dunmow. I was not aware, till I saw Mr. Raynor's note, that this geometer was an Essex species, and I had noted my captures for future record. The other specimens in my collection were taken some twenty years ago, near Chilworth in Surrey, where the species was at that time quite common. I should also like to record the occurrence of *Melanippe procellata* at Bigods, as this species is generally associated with chalky districts. We are a long way from the chalk at Dunmow, but the district is covered in parts by chalky boulder clay.—R. MELDOLA; 6, Brunswick Square, W.C.

COREMIA QUADRIFASCIARIA IN ESSEX.—On July 11th, 1893, I met with a couple of wasted female specimens of this species in a chalk-pit near Grays, Essex; from the ova of one of them a few examples were bred, emerging the following May.—R. M. PRIDEAUX; Reigate, Surrey, Aug. 13th, 1900.

SCOTOSIA VETULATA AT HEMEL HEMPSTEAD.—A single male specimen of this local insect has been taken here, early in July. It was beaten from a very thick hedge, under the shelter of a high bank. The hedge runs between the cemetery and Anchor Lane.—BERNARD PIFFARD.

PLUSIA MONETA IN OXFORDSHIRE.—Three specimens have been taken this year: the first on July 8th, at dusk, hovering over honeysuckle in the vicarage garden; the second on the following evening, at the same bush, by my son; a third on July 21st, at light, in the study. The specimens have been identified at the Oxford University Museum, and one deposited there. It is believed that this is the first recorded occurrence of the insect in Oxfordshire.—JOHN W. B. BELL; Pyrton Vicarage, Oxon.

DICYCLA OO IN SURREY.—On July 16th I took here a female specimen of *D. oo;* is not this rather a rare species so near London?—LEWIS S. GILES; 1, London Road, Norbury, S.W., Aug. 16th, 1900.

DASYCAMPA RUBIGINEA IN DORSETSHIRE.—I took two specimens of *D. rubiginea* in 1898, and the same number of examples in 1899.—C. E. O. CARTER; Parkstone, Dorset, July 15th, 1900.

LARVA OF ACRONYCTA ALNI AT TUNBRIDGE WELLS.—On Aug. 1st a larva of *A. alni* was taken by me on a small elm-tree on Tunbridge Wells Common. It has since pupated.—T. PERCIVAL SMITH; Relva House, Sutton, Surrey, Aug. 9th, 1900.

MACROGLOSSA STELLATARUM, &C., AT HUDDERSFIELD.—*M. stellatarum* has again occurred all over this district, and has been common at flowers in my own garden. It has been even more plentiful than last season, when it was also common, but until that year had scarcely been seen here for probably twenty years or more. It is possible that this year's specimens may be the produce of the district specimens of 1899; but I am more inclined to consider it another migration of the species, though it is extraordinary it should occur in two following years after so long an interval. *Plusia gamma* has swarmed here this year and is still abundant, but I have seen nothing of *Vanessa cardui.*—GEO. T. PORRITT; Crosland Hall, Huddersfield, Aug. 10th, 1900.

COLIAS EDUSA AND C. HYALE IN 1900.—We have received a number of reports of the capture of these species in various parts of England during August and the latter part of July. As other notes on the occurrence of the species will probably be sent in, it seems advisable to postpone publication until the October issue, when a fuller list of localities may be available.

VANESSA ANTIOPA IN OXFORDSHIRE.—I have to-day, Aug. 19th, taken a specimen of *V. antiopa* in the vicarage garden, on a post which had been sugared for moths last night.—(Rev.) JOHN W. B. BELL; Pyrton Vicarage, Watlington, Oxon.

SPHINX PINASTRI IN SUFFOLK.—On July 29th, while cycling near Southwold, in Suffolk, I captured a male *S. pinastri* at rest on the trunk of an oak about nine feet from the ground. It is in very fair condition, and I should think was undoubtedly bred in the locality.—ALFRED E. DOUGLAS.

SPILOSOMA LUBRICIPEDA EMERGING IN AUGUST.—I have noticed this season that *S. lubricipeda* is double-brooded, and as I find in all the entomological works to which I have immediate access that the insect remains in the pupa throughout the winter, my experience may be worth recording. The ova were laid June 4th, hatched June 27th; larvæ full-fed about July 25th; and first imago emerged Aug. 13th, since when a considerable number have come out. The larvæ were fed entirely on stinging-nettle.—ALFRED E. DOUGLAS; "Glen Royd," Devon Crescent Road, Red Hill, Aug. 16th, 1900.

ACHERONTIA ATROPOS IN BUCKS.—Eight fully-fed larvæ of this species were found during the last week in July, on a potato patch near Haddenham. I managed to secure the last three taken, the others being previously destroyed by the finder.—W. H. BARTON; The Poplars, Spencer Road, Grove Park, Chiswick, W.

ACHERONTIA ATROPOS AT NORTHAMPTON.—An entomological acquaintance has just informed me that this species is plentiful in the larval stage around the above town this year. He further states that he had in his possession eight fine examples, two of which he forwarded to me.—A. D. IMMS; "Linthurst," Oxford Road, Moseley, near Birmingham, Aug. 20th.

ACHERONTIA ATROPOS AT CHICHESTER.—The larvæ of *A. atropos* have been fairly numerous here this season. The first found was on July 28th. —JOSEPH ANDERSON.

LEUCANIA ALBIPUNCTA AT BEXHILL.—Whilst sugaring at Bexhill-on-Sea on Aug. 18th and 19th, Professor Meldola and myself took four *L. albipuncta.* I do not know if this locality has previously been recorded.—J. W. FINZI; 53, Hamilton Terrace, N.W., Aug. 22nd, 1900.

SUGARING.—I am pleased to be able to say that I have found sugaring very successful this year. Most of the species taken are common, but they are in quantity more than I have found the last five or six years. *Noctua* *rhomboidea* I have previously taken singly, but never such numbers as it is in this year. *Dicycla oo* I have been unable to take where I used to get it three years ago. *Triphæna fimbria* is common. The above remarks refer to woods within ten miles of London.—WALTER DANNATT; "Donnington," 75, Vanbrugh Park, Blackheath, S.E., Aug. 21st, 1900.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*June 6th*, 1900.—Mr. George Henry Verrall, President, in the chair. Mr. Hedworth Foulkes, B. Sc., of The College, Reading; and the Rev. H. C. Lang, M.D., of All Saints' Vicarage, Southend-on-Sea, were elected Fellows of the Society.—Mr. G. H. Verrall exhibited a species of the genus *Ceratitis*, Macleay, apparently identical with Bigot's *C. frenicillatus*, from the Gold Coast (W. Africa). Mr. Claude Fuller, State Entomologist for the Department of Agriculture, Natal, writes of this as "one of our greatest local pests which is responsible for the destruction of tons of fruit; the larvæ infest apples, apricots, peaches, plums, oranges, mangoes, guavas, and I have reared them from the berries of *Solanum giganteum*." Mr. Verrall also exhibited a very handsome Trypetid reared from the fruit of *Mimusops caffra* by Mr. Claude Fuller at Durban.—Mr. C. O. Waterhouse exhibited specimens of a hemipteron, *Aspongopus nepalensis*, from Capt. Gorman, I.M.S., who states that they are found under stones in the dry river-beds of Assam. They are much sought after by the natives, who use them for food pounded up and mixed with rice.—Mr. Merrifield exhibited a number of pupæ of *Aporia cratægi*, and called attention to the want of correspondence between the markings on the pupal and those on the imaginal wing. On the latter, as is well known, there are no spots, only darkened nervures, the darkness spreading out a little on the outer margin, but on the former there are black spots, some of them forming an oblique black row across the wing, a series of black marginal spots, and no darkened nervures; and, when the imago is about to emerge, so that its markings show through the transparent pupal wing, it is seen that its nervures run between the black marginal spots on the pupal wing, which in no way correspond to the broadening out of the marginal terminations of the dark nervures on the imaginal wings. There is great variety in the black markings on the pupal wing; in some they are few and small, in others they expand and unite, so that more than half the wing is black. The ground colour of the pupa varies from bright greenish-yellow to whitish-grey. As might be expected of an insect whose larva pupates by preference on stems screened by foliage, its colour is not very greatly affected by its surroundings. On comparing some which had had yellow or orange surroundings with others which had had dark ones, it was shown that the former tended to yellow ground colour, and the latter to grey, having also an increase of the dark spots with which the thorax and abdomen are thickly strewn.—Mr. Merrifield also exhibited some enlarged coloured photographs of the green and dark forms of *Papilio machaon*, obtained by causing the larvæ to pupate on green, yellow, or orange surfaces, and on dark ones respectively. In answer to Mr.

Jacoby he stated that though, when the pupa first appeared, it was always of the green form, it had also, if it was going to be a dark one, from the moment of its appearance a few very minute subdorsal and sublateral dark spots, and a little darkening of the anal end. The darkening began to spread in an hour or two, and at an ordinary temperature was complete in much less than twenty-four hours. Whether the pupa was to be green or dark was determined by the surroundings to which it had been exposed before it had cast off the larval skin, and, if it was going to be a dark one, the dark colouring came on exactly the same in complete darkness as in light.—Sir G. F. Hampson exhibited specimens of a moth belonging to the subfamily Hydrocampinæ of the Pyralidæ: *Oligostigma aræalis*, Hampson, from Ceylon, where his correspondent, Mr. J. Pole, had met with a swarm on an island in a river which he estimated at 20,000. When disturbed the buzz made by their wings was quite audible, and after three waves of the net 236 specimens were bottled from round its edges, the net still appearing quite full; as in the some thirty specimens sent the sexes were in almost even proportions, this was not a case of male assemblage. He also exhibited cleared wings, showing the neuration of *Diacrissia russula*, *Tyria jacobææ*, *Callimorpha hera*, and *C. dominula*, the two former being typical Arctiadæ and agreeing with the definition of that family in the costal vein of the hind wing anastomosing with the subcostal to half the length of the cell, whilst in the two latter and also in the eight or ten other known species from the oriental region the costal vein does not anastomose with the subcostal, but only connects with it at a point. He contended that the genus *Callimorpha* should therefore be removed from the Arctiadæ and placed in the Hypsidæ, where it is closely allied to *Nyctemera*, *Callarctia* and other genera, and that the fully-developed proboscis, the non-pectinate antennæ, the smoother scaling, the more diurnal habit, and the larvæ being scantily clothed with hair, all bore out the correctness of this association, — Dr. Chapman exhibited a portion of a stem of *Ferula communis* from Ile St. Marguerite, near Cannes, showing pupa-cases of *Lozopera francillonana*. The larva feeds in the flower-heads and seeds, and burrows into the stem for hybernation. It does so anywhere, but in the majority of cases under the protection of the great sheathing petioles at the lower joints. As many as thirty or forty and even fifty holes of entry may often be counted immediately above one node. When the larva pierces the stem it is full grown, and the entry holes are as large as or larger than those of exit. Dr. Chapman doubted whether it eats any of the material when it is freshest at the date of entry. The burrows in the stem are full of bitten but undigested material. These burrows proceed in all directions, but most frequently upwards, for several inches, often as much as eight or ten inches, and then approach the surface, and the burrowing appears to go on all winter. In February and March larvæ may be found that have not completed their burrows. On completion the burrow approaches the surface, and the opening is of full calibre, but a delicate film of tissue is left to be ruptured by the emerging pupa. On the specimen exhibited about a dozen empty pupa-cases protruded, and it was noticeable that they all faced downwards. This was in a sense accidental. The larva burrowing upwards makes the final portion of the burrow curved. The pupa, as in most Tortrices, is also curved when extended, and so, when extruded, continues the curve of the burrow. As this curve is upwards inside the stem, horizontal at the surface of the stem, it becomes downwards if continued outside. One pupa-case just below the node was not so correctly oriented, whilst in other specimens a pupa emerging below the node, and therefore from a downward burrow, faced and curved upwards. A number of vacant holes were also visible, being the exit of an ichneumon, which affects a large majority of the Tortrix. The species was believed to be *Chelonus inanitus*, Nees. The heads of several dead ones that failed to emerge successfully were to be seen at some of the holes. Dr. Chapman said he had placed a black circle round four holes, as prepared by the larva of the Tortrix for emergence, that were still intact, and in two of these it was to be noted that the diaphragm was, as he had described, the cuticular tissue of the plant; in the two others, however, this had been damaged, and here the larva had made a silken diaphragm fortified with chips of the stem-tissue. In the neighbourhood of the node especially, the holes of entry were to be seen packed tightly with frass, which appeared to be uneaten material. At the extremities of the specimen, which was too short to contain the whole of the individuals that entered at this node, the larvæ had burrowed in the stem. — Mr. F. Enock exhibited living specimens of male and female *Ranatra linearis*, Linn., from Epping, together with the peculiar forked eggs, which he had observed laid by the *Ranatra*, as it rested upon the upper surface of the leaf grasping the edges with its claws. The short anterior legs are held well up close together, in a line with the body, the head raised about an inch from the leaf, while the tip of the abdomen and ovipositor is pressed against the leaf—a downward and forward movement being given. The ovipositor is thus forced through the leaf, then partially withdrawn and the egg extruded and forced into the hole as far as the forked filaments, which prevent it from going right through the leaf. The eggs are frequently laid in the half-decayed stems of aquatic plants. The peculiar *Prestwichia aquatica*, Lubbock, has been bred from the eggs of *Ranatra*.— Mr. H. K. Donisthorpe exhibited a larval case of *Clythra quadripunctata* from the nest of *Formica rufa*, and a case fastened to a piece of wood in the nest containing pupæ; larva- and pupa-cases in spirit, removed from cases, and an empty case fastened to a twig, showing how the beetle escapes; and the perfect insect. He also exhibited *Lomechusa strumosa* with its host *Formica sanguinea*, sent by Father Wasmann from Holland, the insects mounted in the position assumed by the guest and host when the former is being fed by the latter; and *Cossyphodes bewickii*, Woll., a beetle from Cape Colony, with ants with which it is found—*Pheidola megacephala*, var. *punctulata*, Mayr. The beetle is a good example of the protected guests. — Mr. C. J. Barrett exhibited two females of *Spilosoma mendica* reared by Mr. J. E. Robson, of Hartlepool, tinged with purplish pink, and ordinary specimens of the same for contrast.—A paper was communicated on "Life-histories of the Hepialid group of Lepidoptera," by Mr. Ambrose Quail; and "A note on the habits and structure of *Acanthopsyche opacella*, H. Sch.," by Dr. T. A. Chapman. — C. J. Gahan and H. Rowland Brown, *Hon. Secs.*

RECENT LITERATURE.

E. P. Felt. *Insects Injurious to Forest Trees.* (1898, Fourth Ann. Rep. Commiss. Fisheries, &c., of New York, pp. 1–31 [? sep. pag.]. Plates 1–3 and 11, text-figures, &c.).

Although dated 1898, copies of this valuable paper have only recently arrived in London. It consists of a report on the insects injurious to maple-trees, the following species being discussed, viz. *Notolophus leucostigma*, *Clisiocampa disstria*, *Zeuzera pyrina*, and *Sesia acerni* [Lepid.]; *Plagionotus speciosus* and *Elaphidion villosum* [Coleopt.]; and the Coccid *Pulvinaria innumerabilis.* Of these the life-history, habits, distribution, natural enemies, and remedies against their depredations are discussed, with coloured illustrations of the various stages of the pests and of their operations, with text-figures of their foes, and various other details.

Of special interest to the workers who limit their energies to palæarctic forms will be the account of the "leopard-moth" (*Zeuzera pyrina*), an accidental introduction into America, the earliest authentic record there being as recent as 1882. Twelve years later it was characterized as "one of the worst insects we have to contend with." Limited at present to New York, New Jersey, Connecticut, &c., it will doubtless rapidly extend its distribution, especially in a northerly direction. It has been recorded as attacking eighty-three species of trees and shrubs, elms and maples suffering most severely, and in Central Park almost every species of tree and shrub, except evergreens, was injured to some extent.

The Report is prepared in the thorough and lucid manner usual with the entomologists of New York State Museum, and the three coloured plates and the plain figures—three of which are full-page, representing a spraying outfit in operation, a defoliate sugar orchard, and details of the hymenopteron *Thalessa lunator*—are all well executed.

G. W. K.

W. A. Luff. *The Insects of Alderney* (Trans. Guernsey Soc. Nat. Sci. 1899, pp. 1–23 [sep. copy ?]).

Five hundred and nineteen species are now recorded from this interesting island, consisting of 138 Lepidoptera, 64 Rhynchota, 143 Coleoptera, 113 Hymenoptera, 45 Diptera, 4 Trichoptera, 7 Orthoptera, and 5 "Neuroptera"; so that additions will probably be made among the Homoptera, Diptera, and smaller Hymenoptera.

23 Lepidoptera, 10 Rhynchota, 15 Coleoptera, 31 Hymenoptera, and 2 others—a total of 81—are noticed as not occurring in Guernsey, but no comparison is made with Jersey. Among the insects not found in Britain may be noted *Eubolia peribolata* (Lep.), *Lygæus punctatoguttatus* (Rhynch.), *Rhizotrogus æstivus* and *Cryptocephalus vittatus* (Col.) *Andrena flessæ* and two Ichneumonidæ (Hym.).

We trust that Mr. Luff will shortly prepare a work on the Insect-Fauna of the Channel Isles, in which he will include a map of the islands, and tabular comparisons of the faunas of the various islands *inter se*, and with the South of England and Normandy.

G. W. K.

Occasional Memoirs of the Chicago Entomological Society. Vol. I. No. 1. March, 1900. Containing :—

(1) J. L. HANCOCK: "Some New Tettigidæ from Madagascar," based on the collection of the English orthopterist Burr, pp. 1–16. Plate I.
(2) J. TOUGH : "A New Species of *Gomphus*" [Neuroptera], pp. 17–18.
(3) J. G. NEEDHAM : "Insect Drift on the Shore of Lake Michigan," pp. 19–26.
(4) A. J. SNYDER : "The Argynnids of North America," pp. 27–38.

Another addition to the already unwieldy periodical literature of Entomology. It is, however, but just to say that it apparently possesses distinct scientific value.

DR. NEEDHAM discusses the mortality among insects occasioned by storms and floods. He remarks that at certain times there are "a few insects cast up by the waves [of lakes, &c.] habitually," *viz.* May-beetles (*Lachnosterna*) in early summer; strong-flying butterflies (*Anosia plexippus*, &c.) throughout the summer; and on warm hazy days in September and October, grouse-locusts (Tettigidæ); these he considers have fallen into the water alive, since they are able to crawl upon the beach, although sorely battered and torn. On Lake Michigan beach, however, in August of last year, the light-coloured sandy beach appeared black after a couple of days' storm, being thickly covered with "millions" of black crickets (*Nemobius fasciatus*), either dead or half-drowned, in a continuous line in both directions. There were other insects present, but in vastly inferior numbers, and the "wreckage" was examined carefully for a mile along the shore. "Only insects seemed to have suffered by the storm; no other dead animals were seen on the beach, save the occasional fishes which are always to be found there."

The next day was spent, three miles south, in studying the harvest, a mile of the shore being qualitatively examined.

Orders.	Lesser Groups.	Conditions on approaching shore.	Finally killed. per cent.
Orthoptera.	Gryllidæ—Crickets.	Mostly alive.	50
,,	Acridiidæ.	,,	50
,,	Tettigidæ.	All alive.	...
,,	Locustidæ.	Few alive.	100
Odonata.		None alive.	100
Lepidoptera.		Mostly alive.*	100
Coleoptera.	Coccinellidæ.	A few dead.	5
,,	Scarabæidæ, &c.	Many dead.	75
Diptera.	Asilidæ—robber-flies.	Mostly alive.	40
,,	Muscidæ, &c.	All dead.	100
Hymenoptera.	Bumblebees and Wasps.	,,	100
Trichoptera.		Mostly alive.	10
Hemiptera.	Stink-bugs.	Mostly dead.	100
,,	Water-bugs.	Few dead, but fewer uninjured.	90

* "But with wings ruined for flight; ultimately the victims of predatory foes." "Every few feet along the wind-row, perched on some high point, would be seen a poor butterfly, trying vainly to use its ragged wings."

Finally, Dr. Needham gathered about a litre* of the drift, consisting of "insects intermixed with a considerable quantity of cinder flotsam from the lake steamers, scooping it up with a trowel, and made a quantatitive examination . . . It contained the following":—

2520 crickets (*Nemobius fasciatus*).
601 red-legged locusts (*Melanoplus femurrubrum*).
170 other Orthoptera of five species mostly.
75 dragonflies of two species.
15 butterflies of four species (*Anosia plexippus*, *Pieris rapæ*, *Polygonia* sp., and *Argynnis* sp.).
30 moths in very bad condition.
49 Diptera.
10 bumble-bees.
21 "wasps."
31 land-bugs of four species.
11 water-bugs *Belostoma* [*Zaitha*] *fusciventris*).
16 Trichoptera.
220 Coleoptera, not including a large number which were probably foragers.

3769 Total in one pint and three quarters!

In conclusion, Dr. Needham notes two facts: (a) The species present were nearly all in almost inconceivable numbers. "Twenty-five hundred and twenty crickets per meter,† and the drift-line perhaps fifty miles, perhaps a hundred miles long!" Despite the enormous numbers of drowned individuals, the dragonflies were flying the next afternoon in their usual haunts as thickly as ever. (b) "The species were nearly all the dominant ones in their respective groups."

The paper is illustrated by a photograph of the shore, showing the drift-line of insects.

Mr. Snyder does not synoptically revise the North American Argynnids, but, after some preliminary remarks, notices most of the individual species. Fifty-seven species and fifteen varieties are acknowledged, and apportioned among six groups, of which the following species serve as types, viz. *diana*, Cram.; *monticola*, Behr.; *edwarsii*, Reak; *semiramis*, Edw.; *eurynome*, Edw.; and *myrina*, Cram. The author mentions that he "has on several occasions taken the sexes of different species *in coitu*, and from personal observation satisfied himself that the Argynnids are polygamous in their habits. Somewhat similar species are frequently found in the same locality, and with them examples which are clearly varieties or intergrades. . . . Another fact generally overlooked is, that almost without doubt there are dimorphic males and females of some species of *Argynnis*. There is little question of the fact that there are two forms of the female of *cybele*. *Artonis* and *eurynome* cohabit, also *eurynome* and *clio*." A large series of specimens is evidently necessary for the elucidation of this difficult group, as Mr. Snyder mentions that he has captured between thirteen and fourteen hundred examples of *A. eurynome* and its variety *artonis*!

G. W. K.

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* About 1¾ pint.

† Misprint for "litre."

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SOME ADDITIONAL NOTES ON *ÆSCHNA CYANEA.*

By Rev. Arthur East, B.A.

Now that the dragonfly season is drawing to a close, the Editor will perhaps allow me to offer a few notes on *Æschna cyanea*, supplementary to those which appeared a short time since (*ante*, p. 211). It is well known that during the final change of this nymph the head and thorax are thrown right back, and that the emerging insect hangs suspended head downwards from the old nymph skin. No observations, however, seem to be recorded as to the manner of the previous changes—those, namely, which take place under water—and it is surprising how seldom one catches the nymph in the act of changing: the pale green object always seems to have *just* finished. However, several have been seen this season, and the process is as follows.

The nymph seems to be much extended, the joints of the abdomen appearing stretched, and especially the head seems to be extended far forward. Soon a split occurs down the middle of the back of the thorax, and the pale green body is extruded *straight forward* by muscular action of the abdomen alone, the legs taking no part in it, nor is the body bent at all in any direction. When the whole nymph has projected itself out of the old skin, with the exception of the last two segments, it rests for a short while (two or three minutes, perhaps), the legs all parallel with one another and with the abdomen, and reaching slightly forwards, but touching nothing. Then the nymph gently takes hold of the support it is on with all six legs, gives a slight wriggle with the abdomen which shakes it free from the cast skin, and is ready in half an hour to begin feeding again. The whole process is very short, and from the first appearance of a split in the nymph skin to the skin's final rejection it only takes a few minutes—seven or eight perhaps.

The following observations (although incomplete) will, I hope, throw some light on the length of time that *Æ. cyanea* spends as a nymph, and also on the number of times it changes its skin. In January of this year two or three nymphs were taken from a pond in my garden, and these measured 20 mm. each. Together with others from the same pond, they have all (with one exception) changed into perfect insects. In July of this same year nineteen small nymphs, 10–17 mm. long, were found in the pond, this date being of course long anterior to the time when *Æ. cyanea* begins ovipositing. It may of course be thought that these are only some belated specimens, but it will, I think, be agreed that this supposition cannot be maintained when it is stated that during August more than two hundred nymphs, all of about this size, were taken from the same pond. In confirmation of the view that these are last year's laying, I was fortunate enough to find in one aquarium, on July 30th of this year, a solitary nymph 10 mm. long, and upon searching the aquarium three empty skins were found, measuring respectively 6½ mm., 5 mm., and 3½ mm. Now, looking to the fact that the egg of *Anax imperator* (according to Mr. Lucas) is 1⅔ mm. long, this smallest nymph skin, measuring 3½ mm., must be the first or second skin cast. The nymph is now 20 mm. long, and has cast since first observed seven skins, so that at 20 mm. long we may say that the nymph has cast eight skins *at least*, possibly nine or ten. The observation will, if possible, be completed next year; but I venture to give this information now, as, owing to a fortunate accident, these earlier changes, which are the only difficult ones to observe, have been recorded.

The two hundred nymphs referred to above, or rather those that remain uneaten by the survivors, now measure about 17–22 mm., will, I imagine, grow but little during the winter, and will be ready to come out next June or July, thus giving two seasons as the *normal* time for the growth of the nymph of *Æ. cyanea.* I have, however, one nymph almost full grown, which has been very slow in growing all this year, and which may, not improbably, be unready to change before the season is too far advanced; if so, it will no doubt come out very early next year, giving the impression that it belongs to a different hatching from those which came out last July, which it does not.

A very interesting point remains as to when the nymph 3½ mm. long mentioned above was hatched. Unfortunately, I cannot say precisely when it got into my aquarium; it was certainly not *before* January of this year, and it may have been as late as June; in any case, the earliest stages of all must be extremely slow, *or* the eggs must remain unhatched for several months; possibly the eggs lie dormant from November or earlier, during the whole of the winter, and are hatched in spring.

Observations have been made on forty-six adult nymphs (all of *Æschna cyanea*) this year. All climbed out of the water to make their final change to the perfect insect between 8.15 p.m. and 8 a.m., the greater number between 8.15 p.m. and 10.30 p.m. Of these, twenty-two were males and twenty-four females, and it was very noticeable how evenly the sexes kept pace with each other: at no time was one sex more than two or three in advance of the other in the order of their emergence. The earliest to emerge was one on June 13th, and the latest on August 17th; but one, as already stated, has still to change, having indeed not yet cast its penultimate skin. *Æschna cyanea* is an admirable nymph to observe, as it is of a very game and sporting nature; the manner in which it will tackle a worm many times its own length is indicative of very great tenacity of purpose. It has but little skulking in its composition; nothing which moves in the water, if not too enormous, comes amiss to it; but perhaps what is most tempting to a by no means fastidious appetite is the blood-red figure-of-8 worm, or the gnat larva of the domestic water-butt. If any brother odonatist wants specimens of *Æ. cyanea*, it will be a genuine pleasure to me to send them, and I have plenty wherewith to supply several to all who are likely to want them. This nymph is very hardy in the aquarium, and but seldom during the earlier stages of its existence comes to any misfortune, except, be it sorrowfully admitted, a violent end at the hands—or jaws—of its own kindred.

South Leigh Vicarage, Witney, Oxon.

BRITISH DRAGONFLIES OF THE OLDER ENGLISH AUTHORS.

By W. J. Lucas, B.A., F.E.S.

(Continued from p. 217.)

6. *J. Curtis: 'British Entomology,'* 1823–1840. [Neuroptera, three plates, 1836, 1838, and 1839.]

Curtis figures three species, and gives in the accompanying letterpress a full account of each. Following the notice, in each case, is a list of other species belonging to the three genera—*Libellula*, *Cordulia*, and *Agrion*—to which he assigns them; but these being without descriptions they can only be identified, in many cases, by reference to the authors which Curtis quotes in connection with them. The following list gives, in all probability, the names at present used for the insects which Curtis intended to enumerate.

Genus Libellula.

Sheet 712.

1. **depressa** = *Libellula depressa.*
2. **quadrimaculata** = *L. quadrimaculata: prænubila* is mentioned as a variety of it.

3. **bimaculata** = *L. fulva.*
4. **conspurcata** = *L. fulva.*
5. **cancellata** = *Orthetrum cancellatum.*
6. **Sparshalli** = *Pantala flavescens;* but the report of the capture is considered to be erroneous (*vide* De Selys' 'Revue des Odonates,' p. 260).
7. **cœrulescens** = *Orthetrum cærulescens.*
8. **vulgatum** = *Sympetrum striolatum.*
9. **Veronensis** = *S. scoticum.*
10. **flaveolata** = *S. flaveolum.*
11. **angustipennis** = *S. sanguineum.*
12. **Roeselii** = *S. sanguineum.*
13. **Scotica** = *S. scoticum: pallidistigma* is mentioned as a variety of it.
14. **rubicunda** = *Leucorrhinia dubia.* The female is well figured on plate 712, though the colouring resembles more that of the male. A full description accompanies the plate.

Genus Cordulia.

Sheet 616.

1. **metallica** = *Somatochlora metallica.* This seems to be given as British on the authority of Harris's figure, which there is very little reason for considering *metallica*, and which he himself calls *ænea.*
2. **ænea** = *Cordulia ænea.*
3. **Curtisii** = *Oxygastra curtisii.* The female is well figured on plate 616, and there is a full description in the accompanying letterpress.

Genus Agrion.

Sheet 732.

1. **platypoda** = *Platycnemis pennipes.*
2. **Chloridion** = *Erythromma naias.*
3. **fulvipes** = *Pyrrhosoma nymphula.*
4. **rufescens** = Probably *Ischnura elegans*, the variety with orange thorax.
5. **minium** = *P. nymphula.*
6. **annulare** = *Agrion puella.*
7. **furcatum** = *A. puella.*
8. **hastulatum** = *Enallagma cyathigerum.*
9. **Puella** = *Agrion puella.*
10. **pulchellum** = *A. pulchellum.*
11. **zonatum** = This is apparently given on the authority of Leach's MSS. What insect it represents I am not able to say.
12. **xanthopterum** = *Ischnura pumilio.*
13. **elegans** = *I. elegans.*
14. **ezonatum** = *I. elegans.*
15. **rubellum** = *I. pumilio.* Plate 732 has a fine figure of the female, var. *aurantiacum*, accompanied by a full description in the letterpress.

ON A SMALL COLLECTION OF LEPIDOPTERA FROM PEMBA ISLAND.

By W. L. Distant.

Pemba is a small island situate a little north of Zanzibar, and, by the good offices of Mr. T. P. Newman, Mrs. Theodore Burtt, whose husband is engaged in missionary work on that spot, has sent me a small collection of Lepidoptera. The seventeen species of butterflies are all old friends, being well known on the east coast, and many from the Transvaal. *Acræa zetes* is also a west coast species, and *Baoris mathias* is eastern in distribution, being also found in the Oriental and Malayan regions. The few moths call for little comment. *Pitthea trifasciata* was described by Dewitz from Zanzibar; and a species of *Syntomis* appears to be nondescript, and is here described.

RHOPALOCERA.

Nymphalidæ.

Acræinæ.

Acræa zetes, Linn.
A. natalica, Boisd.
A. acara, Hew.
A. neobule, Doub. & Hew.
A. buxtoni, Butl.
A. encedon, Linn.

Nymphalinæ.

Junonia cebrene, Trim.
J. clelia, Cram.
Precis elgiva, Hew.
P. natalica, Feld.
Hypolimnas misippus, Linn.

Papilionidæ.

Pierinæ.

Terias zoë, Hopff.
Catopsilia florella, Fabr.
Belenois mesentina, Cram.

Papilioninæ.

Papilio demoleus, Linn.

Hesperiidæ.

Gegenes hottentota, Latr.
Baoris mathias, Fabr.

HETEROCERA.

Syntomidæ.

Syntomis burtti, sp. n.
Euchromia lethe, Fabr.

Arctiadæ.

Argina astrea, Dru.

Geometridæ.

Pitthea trifasciata, Dewitz.

Syntomis burtti, sp. n.

Head and pronotum fuscous, anterior and lateral margins of pronotum broadly ochraceous; abdomen above ochraceous; body beneath ochraceous; antennæ, eyes, legs, and apex of abdomen fuscous. Wings fuscous; anterior wings with two subquadrate ochraceous spots near base, the first in cell, the second immediately beneath it; two large pale subhyaline spots on apical area each divided by a nervure, the upper spot longest and narrowest; posterior wings with a central ochraceous spot joined to abdominal margin, which is also ochraceous for about half its length from base. Exp. wings: ♂, 22 mm.; ♀, 24 mm.

Hab. Pemba Island (Mrs. Theodore Burtt).

ON THE NOMENCLATURE OF THE GENERA OF THE RHYNCHOTA, HETEROPTERA AND AUCHENORRHYNCHOUS HOMOPTERA.

By G. W. Kirkaldy, F.E.S.

(Continued from p. 28.)

I have made free use of my friend Mr. C. Davies Sherborn's colossal 'Index Specierum,' &c., now in manuscript at the British Museum (Natural History) to check my results in some instances, and I am indebted to him for many valuable hints. My thanks are due also to the librarians of the Zoological and Entomological Societies, of whose kindnesses I have liberally availed myself.

In the immediately ensuing part, I have indicated from 1—4 sections under each work:—

(α) genera with valid types; (β) genera without types; (γ) fixation of genotypes; (δ) notes on emendations of names, invalid type-fixations, &c.[1] I have much abbreviated the titles, which can be easily identified from the usual sources; "t." signifies "type." "*" placed before an author's name signifies that I have not been able to examine that work.

1758–1843.

1758. Linnæus, Syst. Nat. x. 434–9. (β) *Cicada; Notonecta; Nepa; Cimex.*

1762. Geoffroy, Hist. abrég. Ins. i. 401–82. (α) *Naucoris*, t. *cimicoides*, nec L. [= *maculata*, Fabr.]; *Corixa* t. *striata*, nec L. [= *geoffroyi*, Leach]. (β) *Tetigonia.*[2] (γ) *Cicada*, 1758, restricted. (δ) *Hepa* for *Nepa*, 1758.

1764. Linnæus, Mus. Lud. Ulric., 153. [(β) *Laternaria.*][3]

1767. Linnæus, Syst. Nat. ed. xii. 1, 703–33. (β) *Fulgora.*

1775. Fabricius, Syst. Ent. 673–732. (α) *Sigara*, t. *striata*, nec L. [=*geoffroyi*, Leach].[4] (β) *Membracis; Cercopis; Acanthia; Reduvius.*

1786. Scopoli, Delic. Faun. Insubr. i. 60–1. (α) *Ploiaria* t. *domestica.*

1787. Swederus, Vet. Ac. Nya Handl. viii. 183–5. (α) *Macrocephalus* t. *cimicoides.*

1789. Olivier, Enc. Méth. iv. 24–5. (β) *Pentatoma.*

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[1] When once a type has been fixed validly, I have ignored any subsequent invalid type-fixations.

[2] Not *Tettigonia*, as usually written; the latter is an orthopterous genus.

[3] N.B. *Cicada laternaria*, Linn., 1758 = *Laternaria phosphorea*, Linn., 1764 = *Fulgora laternaria*, Linn., 1767; *Fulgora phosphorea*, Linn. 1767, is not a Fulgorid. The genus *Laternaria* is invalid, no description having been given.

[4] Homotypical with *Corixa*, 1762.

1790. Fabricius, Skrift. Nat. Selsk. i. (1), 213–28. (β) *Ranatra*.

1794. Fabricius, Ent. Syst. iv. 1–208. (α) *Coreus* t. *scapha*; *Lygæus* t. *valgus*; *Miris* t. *dolabratus*[5]; *Gerris* t. *lacustris*. (γ) *Notonecta*, 1758, t. *glauca*, L. [indirectly].

1796. Schrank, Samml. Naturh. Phys. Aufs. i. p. 121. (α) *Coriscus*, Latreille,[6] Précis caract. gén. pp. iii, xii, 83–92 and 202. (β) *Asiraca*; *Hydrometra*; *Poekilloptera*. (γ) *Acanthia*, 1775, restricted.

1798. Fabricius, Suppl. Ent. Syst. 511–46. (β) *Flata*; *Delphax*. (δ) *Notonecia* for *Notonecta*.

1800. Schellenberg, Cimic. Helv. 1–25. (α) *Aquarius* t. *paludum*, nec L.[7] (δ) *Sigera* for *Sigara*.

1801. Lamarck, Syst. anim. s. Vertèbr. 289. (α) *Scutellera* t. *nobilis*, Sulz., nec L. [= *perplexa*, Hope]. (γ) *Fulgora*, 1767, t. *laternaria*; *Cicada*, 1758, t. *orni*, Fabr. nec L. [= *plebeja*, Scop.]; *Pentatoma*, 1789, t. *rufipes*; *Reduvius*, 1775, t. *personatus*; *Hydrometra*, 1796, t. *stagnorum*; *Nepa*, 1758, t. *cinerea*. (δ) *Tetigonia* restricted to *cornuta* and *spumaria*, 1758, but these were previously removed to *Membracis*, 1775, and *Cercopis*, 1775, respectively. Schrank, Faun. Boica, ii. 1, 44–101. (β) *Thyreocoris*. (γ) *Coriscus*, 1796 t. *dauci* [= *calcaratus*, Linn.].

1802. Latreille, H. N. Crust. Ins. iii. 240–63. (α) *Phymata* t. *crassipes*; *Galgulus*[8] t. *oculata*. (β) *Neides*; *Nabis*; (γ) *Ranatra*, 1790, t. *linearis*; *Cercopis*, 1775, t. *spumaria*.[9] *Schwarz, Vet. ak. Nya Handl. xiii. 180–1. (α) *Copicerus* t. *irroratus*.

1803. Fabricius, Syst. Rhyng. 1–292. (α) *Ledra* t. *aurita*; *Darnis* t. *lateralis*; *Lystra* t. *lanata*; *Derbe* t. *hæmorrhoidalis*; *Iassus* t. *neruosus*; *Issus* t. *coleoptratus*; *Salda* t. *zosteræ*; *Aradus* t. *betulæ*; *Syrtis* t. *erosa*;[10] *Tingis* t. *cardui*; *Canopus* t. *obtectus*; *Tetyra* t. *arcuata*; *Edessa* t. *ceruus*; *Halys* t. *dentata*; *Cydnus* t. *tristis*; *Aelia* t. *acuminata*; *Capsus* t. *ater*; *Alydus* t. *calcaratus*;[11] *Emesa* t. *precatorius*; *Berytus* t. *tipularius*; *Zelus* t. *longipes*. (β) *Centrotus*; (γ) *Flata*, 1798, t. *ocellata*; *Cimex*, 1758, t. *bidens*. (δ) *Tettigonia* (sic) t. *tibicen* does not accord with the diagnosis of the genus, 1762, and in *Membracis* 1775, t. *atrata*, F., the latter is not one of the original species.

1804. Latreille, Nouv. Dict. Hist. Nat. xxiv. Tabl. method.

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[5] Not "*doiobratus*," as saith Fabr.

[6] For date of this work, see Latreille, Hist. Nat. Crust. Ins. iii. (1804), p. vi.

[7] =*canalium*, Duf.

[8] Preoccupied, Aves, 1760.

[9] Stål (Vet. Akad. Handl. viii. 1, p. 11) states *C. carnifex*, Fabr., 1775, as the type. I am unable to discover any indication in the Syst. Ent. that this is so, and consequently have here fixed *spumaria* as the type (see Latreille); *Philænus*, Stål, thus is homotypical with *Cercopis*, Fabr. Latr.

[10] Co-extensive with *Phymata*, 1802.

[11] =*dauci*, Schrank; homotypical with *Coriscus*, 1796.

163–8. (a) *Tetigometra* t. *virescens*;[12] *Cixius* t. *nervosa*. (β) *Velia*. (γ) *Acanthia*, 1775, t. *saltatorius*;[13] *Neides*, 1802, t. *t*[*r*]*ipularius*;[14] *Nabis*, 1802, t. *guttula*; *Membracis*, 1775, t. *foliata*; *Centrotus*, 1803, t. *cornutus*; *Poekilloptera*, 1796, t. *phalænoides*. LATREILLE, H. N. Crust. Ins. xii. 176–337. (δ) *Tyreocoris*, 1801; *Poëciloptera*, 1796.

(?)1805–21. PALISOT, Ins. rec. Afr. Amér. 13–4, 204–5. (β) *Petalocheirus*; *Acanthocerus*. (δ) *Coræus* for *Coreus*.

1806. DUMERIL, Zool. Anal. 260. (β) *Promecopsis*;[15] (δ) *Ploiera* for *Ploiaria*.

1807. LATREILLE, Gen. Crust. Ins. iii. 112–68. (α) *Ochterus* t. *marginatus*; *Belostoma* t. *testaceopallidum*. (β) *Myodocha*.

1809. LATREILLE, Gen. Crust. Ins. iv. 34 and 384. (δ) *Ochterus*, 1807, altered to *Pelogonus* because the former is supposed to be preoccupied by *Ochthera*.

1810. LATREILLE, Consid. gén. anim. 250–64 and 433–4. (α) *Leptopus* t. *littoralis*; *Aetalion* t. *reticulata*; (γ) *Velia*, 1804, t. *rivulorum*; *Asiraca*, 1796, t. *clavicornis*. (δ) *Myodocha*, 1807, t. *serripes*, invalid, not one of original species; *Delphax*, 1798, t. *striata*, not valid, not an original species.

1811. OLIVIER, Enc. Méth. viii. 105 et seqq. (δ) *Myodochus*, 1807; *Ochtherus*, 1807.

1811. LATREILLE, Humboldt's Voy. Ins. 147 et seqq. (δ) *Dedra* for *Ledra*, 1803.

1814. LEACH, Zool. Misc. i. 91. (a) *Mictis* t. *crucifera*.[16] FALLEN, Spec. nov. hem. 1–26. (a) *Pyrrhocoris* t. *apterus*; *Corizus* t. *hyoscyami*. (β) *Anthocoris*, *Geocoris*, *Phytocoris*, *Ulopa*.

1815. LEACH, Brewster's Edinb. Encycl. ix. 120–5. (γ) *Petaloch*[*e*]*irus*, 1805, t. *variegatus*; *Myodocha*, 1807, t. *tipuloides*. (δ) [*Thyreocoris*, 1808, t. *globus*, not an original species]; *Myctis*, 1814; *Cetalion*, 1810.

1817. GERMAR, Reise nach Dalm. 280–90. (a) *Pygolampis* t. *denticulata*.[17] LATREILLE in Cuvier's Règne Anim. iii. 384 et seqq. (δ) *Derba*, 1803; *Tettigometra*, 1803; HOFMANNSEGG, Wiedemann's Zool. Mag. i. pt. 1, 8–56. (β) *Hemityphlus*.[18] [19]

1818. GERMAR, Mag. Ent. iii. 177–227. (β) *Ricania*; LEACH, Trans. Linn. Soc. xii. 10–8. (a) *Plea* t. *minutissima*[20]; HOFMANNSEGG, Wiedem. Zool. Mag. i. pt. 2, 92. (δ) *Aetalia*, 1810; KIRBY, Trans. Linn. Soc. xii. 474–5. (a) *Achilus* t. *flammeus*.

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[12] =*zosteræ*, thus homotypical with *Salda*, 1803.

[13] Thus homotypical with *Berytus*, 1803.

[14] =*acephala*, Fourcr.

[15] =? *Lystra*, Fabr.; no species mentioned.

[16] =*profana*, Fabr.

[17] =*bidentata*, Goeze.

[18] =*Pyrrhocoris*, 1814.

[19] =Herrich-Schäffer states (Wanz. Ins. ix. Hist. übers. 27) that the genus *Notocyrtus* is to be found in this paper, but I have searched in vain. The learned rhynchotist of Regensburg had apparently, however, not actually seen it himself.

[20] =*leachi*, McGreg. and Kirk.

1819–21.[21] Kirby, Trans. Linn. Soc. xiii. 12–23. (*a*) *Anotia* t. *bonnetii*. (β) *Otiocerus*.

1821. Germar, Mag. Ent. iv. 1–106. (*a*) *Cobax*[25] t. *winthemi*;[26] *Penthimia* t. *atra*;[28] *Gypona* t. *glauca*; *Eupelix* t. *cuspidata*. (β) *Aphrophora, Cœlidia*. (γ) *Tet(t)igonia*, 1762, t. *viridis*.

1822. *Thunberg, Hem. rostr. Cap. pp ?. (*a*) *Copius*[22] t. *cornutus*; *Pendulinus* t. *hasticornis*. Eschscholtz, Dorpat Naturw. Abh. i. 57–186. (β) *Halobates*.

1823. Dumeril, Cons. gén. 215–20. (*a*) *Podicerus*[23] t. *tipulaire*.

1824. Curtis [May 1st] Brit. Ent. 20. (β) *Acanthosoma*; [July 1st] 28. (γ) *Acanthosoma*, 1824, t. *hæmorrhoidalis*; Descourtilz, Ann. Soc. Linn. Paris, iii. 293–7. (*a*) *Agenia* t. *lamii*.[27]

1825. Lepeletier & Serville, Enc. Méth. x. 1–324. (*a*) *Holhymenia* t. *latreillei*;[29] *Phlæa* t. *cassidioides*;[24] *Holoptilus* t. *ursus*; *Ectrichodia* t. *cruciata*.[30] (β) *Tessaratome, Pachylis, Pachymerus Astemma*. (δ) *Petalochere*, 1805; Latreille, Fam. Nat. 416–28. (*a*) *Heterotome* t. *spissicornis*;[32] *Tibicen* t. *plebeia*. (β) *Gonocere, Syromaste, Anisoscele, Nematope, Stenocephale, Leptocorise*.[33] (γ) *Tessaratome*, 1825, t. *papillosa*. (δ) *Scutellere, Aelie, Edesse, Pentatome, Coree, Holhymenie, Pachlyde, Heteroscele, Alyde, Neide, Lygee, Pachymere, Salde, Myodoque, Capse, Macrocephale, Phymate, Arade, Punaise, Holoptile, Reduve, Petalocheire, Ploiere, Leptope, Acanthie, Pelogone, Hydrometre, Velie, Galgule, Naucore, Belostome, Nepe, Ranatre, Notonecte, Corise, Fulgore, Flate, Ricanie, Pæciloptere, Listre, Tettigometre, Asiraque, Otiocere, Centrote, Ledre, Cercope, Penthimie, Aprophore, Tettigone, Gypone, Cœlidie, Ulope* (1758–1825); Lepeletier & Serville, Enc. Méth. x. 325–833. (*a*) *Eurymela*[34] t. *fenestrata*; *Globiceps* t. *capito*;[35] *Scaris* t. *ferruginea*; *Evacanthus* t. *interruptus*; *Dysodius* t. *lunulatus*.[36] (β) *Ptyelus, Proconia, Monanthia, Piesma*. (γ) *Aphrophora*, 1821, t. *spumaria*, Germ.[37] (δ) *Heterotoma*, 1825; *Pœcilloptera*, 1796; Curtis, Brit. Ent. [Sept. 1st] 86. (*a*) *Aneurus* t. *lævis*.

1826. *Hahn, Icon. Mon. Cimic.[38]

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[21] =Erichson and Germar quote "1823."

[22] =Some authors quote *Copium*, some *Copius*. I have not seen the book.

[23] =Cotyp. with *Neides*, 1802.

[24] =*corticata*, Drury.

[25] =*Otiocerus*, 1819–21.

[26] =*stollii*, Kirby.

[27] Genus and species remain unknown.

[28] =*nigra*, Goeze.

[29] =*clavigera*, Herbst.

[30] =*Crux*, Thunb.

[31] Preocc. Thunb. 1805.

[32] =*merioptera*, Scop.

[33] =*Myodocha*, 1807.

[34] Ascribed to Hofmannsegg, probably manuscript.

[35] =*sphægiformis*, Rossi.

[36] =*lunatus*, Fabr.

[37] =*alni*, Fall.

[38] Apparently no validly defined genera.

(To be continued.)

NOTES AND OBSERVATIONS.

"Synopsis of Experiments in Hybridization and Temperature made with Lepidoptera up to the end of 1898," by Prof. Dr. Max Standfuss.—We regret that Mr. Dadd has been unable to continue the translation of this important paper, but we are pleased to add that Mr. Kirkaldy has been good enough to take up the work from the point where it was left by Mr. Dadd. An instalment, with plate, will be given in the November issue of the 'Entomologist,' and the remainder, with two plates, in the December number.

Triecphora sanguinolenta, &c.—Dr. Walker has fallen into some little confusion in his "Notes on *Triecphora sanguinolenta*, Marsh., Edw." (Entom. pp. 236–7). The three species mentioned—viz. *mactata*, *sanguinolenta*, and *vulnerata*—are quite distinct, readily separable by structural characters, and, as there are six other palæarctic species, the records from Asia Minor, Spain, &c. do not necessarily refer to *vulnerata*. It may be noted that the correct name of our species is *Tomaspis vulnerata* (Germ.)* = *sanguinolenta* (Geoffr., nec Linné), the genera *Triecphora* and *Monecphora* being synonymous with the earlier *Tomaspis*.—G. W. Kirkaldy.

Gynandromorphous Argynnis paphia.—Perhaps a variety of *Argynnis paphia*, which I have recently acquired, may be worth noticing in the 'Entomologist.' Right wings are those of a female, and of the *valesina* form of that sex; left wings ordinary type of male, with the exception of a black splash resembling *valesina* colouring on the fore wing. The specimen was taken on July 28th last near Lyndhurst.—W. F. Urwick; 34, Great Tower Street, London, E.C., Aug. 27th, 1900.

[This most interesting specimen appears to be very similar to an example captured in the New Forest in 1881, and figured in the 'Entomologist' for 1882 (Pl. I. fig. 5). The latter, however, is not marked with *valesina* colouring on the male side.—Ed.]

Male Bupalus piniaria partly of female coloration.—On June 13th last I took a male specimen of *B. piniaria*, the left pair of wings of which are of the male colour, whilst the right pair of wings are of the colour peculiar to the female of this species.—D. Chittenden; 98, Court Hill Road, Lewisham, S.E.

[We have seen this very interesting aberration, but under circumstances which did not admit of close examination. Except that the right fore and hind wings are of female coloration and their markings somewhat blurred, the specimen appears to be a male.—Ed.]

Orthoptera at Sugar. — On four previous occasions (Entom. xxx. pp. 28, 76; xxxi. p. 267; xxxii. p. 290) I have called attention to certain Orthoptera visiting sugar. During a recent stay in the New Forest, on two or three occasions the sugar was visited by females of our largest native cockroach, *Ectobia lapponica;* while one evening a fairly large green grasshopper, without doubt *Leptophyes punctatissima*, which appears to have been commoner than usual in the Forest this season, made good use of its long legs, and escaped in the process of boxing.—W. J. Lucas; Sept. 8th, 1900.

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* The reference to Illiger is only manuscript.

Satyrus semele. — At the base of a chalk cliff near Lulworth, in Dorset, on Aug. 18th, I came across a large number of *S. semele* on a patch of sea-lavender. They filled the air on my approach. One does not usually associate the grayling butterfly with a habit of this kind.—W. J. Lucas; Sept. 8th, 1900.

CAPTURES AND FIELD REPORTS.

Papilio machaon at Ringwood.—This morning, at about nine o'clock, I captured the finest and most beautiful specimen of *Papilio machaon* that I have ever seen. I was out in a clover-field on the look-out for *C. hyale*, *C. edusa*, and var. *helice*; also *Vanessa cardui*. My daughter Marjorie, who accompanied me, drew my attention to the insect, and I really thought at a little distance that it was a pale var. of *cardui*. It was lazily flying low amongst the clover-flowers, and when it alighted upon one I fortunately netted it. The specimen, which is a female, is in perfect and fresh condition, very pale yellow, the central band of yellow is scarcely divided with black lines, and there is not a trace of any red scales, except the usual two spots upon the hind wings; the body has the black dorsal streak, but the sides are nearly pure white. I have compared it with my Wicken Fen series, and if it were put amongst them it could be detected at a glance; it has a much greater yellow area.—J. Hy. Fowler; Aug. 31, 1900.

Papilio machaon in Sussex.—I caught a specimen of *P. machon* at Hooe, near Pevensey, on Aug. 18th last. It was flying slowly from flower to flower in a field of red clover. The tail on the left hind wing was wanting, and also a piece of the right fore wing; but otherwise the insect seemed to be very fresh.—Lewis L. Turner; 131, Melbourne Grove, East Dulwich, S.E.

Papilio machaon in Kent. — On Aug. 15th I captured, in a railway cutting near Hythe, a fine female specimen of *P. machaon*. — C. W. Hutchinson; 43, Fordwych Road, West Hampstead, N.W.

Vanessa antiopa in Berks, Kent, and Sussex.—For the following records of *V. antiopa* in England this year, published in the 'Times,' we are indebted to Miss Urquhart, of Maida Vale:—

It may be of interest to entomologists to hear that two specimens of that rare insect, *Vanessa antiopa*, have been captured in this neighbourhood during this week. One had been attracted to a bottle put out near some peach trees to attract wasps, containing beer and rum; the other was caught in a garden about two miles distant on a dahlia flower. This latter is a most perfect specimen. I should be interested to hear if any other specimens have been taken in this country during the summer.—Philip A. Houghton; Lindfield, Sussex, Sept. 7th.

On Aug. 18th, at Herne, Kent, my son captured a very fine specimen, measuring 3¼ in. across the wings.—Frederick Single; Fernside, Wimbledon Common.

My son caught a very perfect specimen of the "Camberwell Beauty" on a plum tree in the garden here on Sept. 5th, and saw another close by the garden on the same afternoon. — (Sir) W. Cameron Gull; Yattendon, Berks, Sept. 11th.

On Aug. 26th last a fine specimen of *V. antiopa* was caught close by here on the borders of Sussex and Surrey at Newlands, while attempting to enter a glass trap baited for wasps, as in one of Mr. Houghton's instances.—(Major) R. H. Brown; Crawley-down, Sussex.

Vanessa antiopa in Berkshire.—On Aug. 30th I saw a fine specimen of *V. antiopa* in Berkshire, not far from Streatley.—(Rev.) Archibald Day; The Vicarage, Malvern Link.

Vanessa antiopa in Essex.—On Aug. 31st my friend Robert Wedlake caught in our garden, and gave to me, a splendid specimen of *V. antiopa.*—Harold P. Thompson; Hornchurch, Essex.

Vanessa antiopa in Hampshire.—On Sept. 12th I took a worn specimen of *V. antiopa* in the New Forest; it was flying round a tree which had been sugared the night before.—A. Molineux Smallpeice; Field Lodge, Burley, Ringwood, Hants, Sept. 14th.

Vanessa antiopa in Kent.—A specimen of *V. antiopa* was captured this morning in the garden of Vesey Holt, Esq., Mount Mascal, Bexley. It was sitting on the decayed stump of a tree, and was taken in a landing-net. It is rather small, but, despite the mode of capture, is in splendid condition.—T. B. Andrews; 276, Broadway, Bexley Heath, Sept. 11th.

Vanessa antiopa in Suffolk.—I captured a specimen of *V. antiopa* on Aug. 30th in the neighbourhood of Lowestoft. — E. J. Singleton Smith; St. Margaret's College, Lowestoft, Sept. 1st, 1900.

Vanessa io at Tooting.—On Aug. 31st I was agreeably surprised to see a specimen of *V. io* disporting itself in the garden here. It is the first example of the species I have ever seen in or near to London. It seemed to prefer the late blooms of a patch of red valerian to old sugar, which attracts *V. atalanta* so frequently. — E. Sparke; 1, Christchurch Villas, Tooting Bec Road, Tooting, S.W.

Pyrameis atalanta swarming on a Cossus-infested Birch Tree.—This morning, whilst strolling through a small clump of birches on Wimbledon Common, I was surprised at suddenly disturbing about twenty or thirty specimens of *Pyrameis atalanta.* As the only Lepidoptera observed during the whole morning were a few *Pieris rapæ*, one or two *Cœnonympha pamphilus*, and one *Chrysophanus phlœas*, my curiosity was at once aroused, and I soon found that one particular birch-trunk was the centre of attraction for quite a swarm of wasps as well as the aforesaid butterflies. Closer investigation revealed the reason for this phenomenon, for while I was watching a nearly full-fed larva of *Cossus ligniperda* crawled out of the trunk, and made off at a rapid rate, apparently disgusted with the crowd of uninvited visitors. There were at least thirty specimens of *P. atalanta* in the immediate neighbourhood of the tree, and those which could not get on the trunk settled on the ground, or on the lower twigs of birch near by, and allowed me to take them with my fingers, though the sun was shining brilliantly. I have heard of this particular attraction for some butterflies, but it was my first actual experience of it. I may say that no other butterflies were present with *P. atalanta.* — E. B. Bishop; 60, Griffiths Road, Wimbledon, S.W., Sept. 21st, 1900.

Lycæna bœtica bred in Guernsey.—I have succeeded in discovering larvæ of *Lycæna bœtica* this summer, and I am now breeding some fine specimens of this butterfly. — GEORGE BAKER; 11, Saumarez Street, Guernsey, Sept. 5th, 1900.

THECLA W-ALBUM IN THE MAIDSTONE DISTRICT.—On July 25th I was pleasantly surprised to capture a specimen of *T. w-album* in the garden. Unfortunately it was very worn, and minus a portion of the hind wing.—J. L. SAXBY; Larkfield, Maidstone.

LYCÆNA ARGIOLUS IN NORTH LONDON.—On Aug. 11th I took a male *Lycæna* (*Polyommatus*) *argiolus* in Haringay Park (about four miles from St. Paul's Cathedral). I also saw a specimen near the same spot the last week in July. — H. A. KING; 25, Haringay Park, Crouch End, N., Sept. 18th, 1900.

ACHERONTIA ATROPOS.

GLOUCESTERSHIRE.—Larvæ of this species have been extraordinarily plentiful this summer. Several have been brought to me from potato-fields, and I know of at least twenty others in the possession of gentlemen in the neighbourhood.—(Rev.) A. NASH; Standish Vicarage, Stonehouse, Gloucestershire, Sept. 19th, 1900.

HAMPSHIRE.—I took seven larvæ of *A. atropos* during one afternoon, and found several others, which I did not pick up. So many have been brought to me of late that I have had to refuse them.—J. HY. FOWLER; Ringwood, Sept. 3rd, 1900.

HEREFORDSHIRE.—The larvæ of *A. atropos* have been plentiful this year in the county. I have seen several specimens, and an example of the perfect insect was brought to me on the 18th inst.; it had just been captured in the Market Hall, situated in the centre of the city.—J. B. PILLEY; Hereford, Sept. 20th, 1900.

KENT.—While staying in Scotland last month, I received by post, from my aunt, Lady Naesmyth, a fine larva of *A. atropos*, which she had found in her garden at Tunbridge Wells. The insect was none the worse for its long journey, and has since pupated successfully. — H. W. SHEPHEARD-WALWYN; Glensyde, Bidborough, Tunbridge Wells, Sept. 2nd, 1900.

NORFOLK.—I beg to report the occurrence here of five full-fed larvæ of *A. atropos*. On Aug. 29th one was given me at noon, and another at night of same date. Both of these buried themselves at once. I have heard of other larvæ of same species this season; but these have not come under my own personal observation like the five mentioned above.—J. W. WOOLHOUSE; Summer Hill, Fakenham, Norfolk, Sept. 3rd, 1900.

A fine larva of *A. atropos* was brought to me during the first week in August, which has now safely pupated. According to reports sent to the local papers, larvæ of this species have been very abundant in Norfolk this year.—W. T. HARRIS; 17, Micheldever Road, Lee.

I have had two pupæ of *A. atropos* given me; the larvæ were found in the neighbourhood of Mundesley, Norfolk.—S. W. KEMP; 80, Oxford Gardens, Notting Hill, W., Sept. 17th.

On July 24th eleven fine larvæ of *A. atropos* were found feeding on potato in a garden at Norwich. One of these died shortly after; the remaining ten were full-fed, and had all gone to earth by Aug. 3rd. — R. LADDIMAN; 25, Drayton Road, Norwich, Aug. 24th, 1900.

OXFORDSHIRE.—I have received three larvæ and two pupæ of this moth this August from Eynsham and Headington, Oxon —Harold Thompson; 31, Beaumont Street, Oxford, Aug. 31st, 1900.

Suffolk.—While staying at Middleton, near Yoxford, in Suffolk, I had, on Aug. 4th, a full-fed larva brought to me, and, on investigating a patch of potatoes, I found two more; and my nephew writes that he added another from the same garden, making four in all.—Henry A. King; 25, Harringay Park, Crouch End, N., Aug. 23rd, 1900.

Surrey.—Two specimens of *A. atropos* were taken in a garden here the other day.—Herbert Beadnell; Fernside, Redhill, Surrey, Aug. 7th.

On Aug. 31st I had a fine full-fed larva of *A. atropos* brought to me from Church Lane, Lower Tooting, S.W. It burrowed in the earth of the breeding-box immediately. It was of a decided yellow colour. I have had the pupæ before from that neighbourhood.—E. Sparke; 1, Christchurch Villas, Tooting Bec Road, Tooting, S.W.

Sussex.—Several larvæ of *A. atropos* have been obtained in potato-fields at Hooe.—Lewis L. Turner; East Dulwich, Sept. 20th, 1900.

Worcestershire.—We have thirteen pupæ of *A. atropos*, and know of others; the larvæ were all taken within a quarter of a mile of this vicarage. —(Rev.) Archibald Day; Malvern Link, Sept. 17th, 1900.

Westmoreland.—On Aug. 30th, hearing that a full-grown larva of *A. atropos* had been found crawling across a path in a small garden at Natland, two miles south of Kendal, I at once prosecuted a search through the potato-tops of the first field in that direction. I was rewarded by finding two larvæ almost full-fed. The next day I secured another in the same field, which went down at once. On Sept. 1st, at Low Foulshaw, lying south-west of Kendal, in the neighbourhood of the Witherslack mosses, I found two more, and the frass of a third. The ground colour of one of these larvæ was of a vivid yellow, and stood out in strong contrast to the dead brown potato-top to which it was clinging. They entered the soil to undergo pupation on Sept. 1st, 4th, 5th, and 6th respectively. As two other larvæ have been taken accidentally, there is ground for believing that the species has been more than usually abundant in the district this year. Imagines have from time to time turned up, but, though often searched for, I have never till this year taken the larva. — (Rev.) A. M. Moss; Kendal. P.S.—Since writing the above another larva, about to pupate, has been found in a small garden on Sept. 8th, and presented to me, bringing our total of captures up to eight.

Deilephila galii in Gloucestershire.—I am very pleased to record the capture of *D. galii*. Towards the end of August my son, going round the vicarage garden at dusk, on the look-out for *S. convolvuli*, saw a large insect hovering over some phlox flowers, and promptly secured it. It turned out to be a very fine specimen of *D. galii*, an insect I had never seen alive before. — (Rev.) A. Nash; Standish Vicarage, Stonehouse, Gloucestershire.

Chærocampa elpenor on Wild Balsam. — I wish to confirm my previous note of 1898 (Entom. xxxi. 243), in which I recorded *Impatiens noli-me-tangere* as a pabulum for *C. elpenor*. I have again, on Sept. 15th, taken a full-grown larva on the identical patch of balsam. Several others have this year, but earlier, been found feeding on the common *Epilobium*.— (Rev.) A. M. Moss.

Noctua castanea in the New Forest.—It may be worth recording that while sugaring in the New Forest, on Aug. 15th last, I took a specimen of the red form of *Noctua castanea*, of the same tint as those from the north. I am told that this form has not been previously taken in the forest. Perhaps this note may bring others to light.—(Rev.) W. Claxton; Navestock Vicarage, Romford.

[*N. castanea*, in its typical form, is red; the grey form is var. *neglecta*. We believe that the type is not altogether unknown in the New Forest, but it would be interesting to have more information on this point.—Ed.]

Aplecta occulta in Norfolk.—On Aug. 28th I had the good fortune to take a fine specimen of *Aplecta occulta* on sugar at Paston, near Mundesley, Norfolk. The specimen is of the light form, and the markings are extremely well defined. — S. W. Kemp; 80, Oxford Gardens, Notting Hill, W.

Catocala nupta on Tarred Posts.—While walking along the road through Bagley Wood, near Oxford, at the end of August last, I saw on two occasions a considerable number of specimens of *Catocala nupta* at rest on tarred telegraph-posts. Most were high up the posts, and all, I believe, on the southern aspect of them. The posts had not lately been tarred, and though black in some parts were in others, especially on the southerly side, brownish, and often with a marbled appearance, due to the grain of the wood showing. On the lighter parts of their resting-places the insects were not specially conspicuous, though generally quite easily seen. On one post there were six specimens, and on two others five each. In some cases, two or more individuals were quite close to each other.—W. J. Lucas; Sept. 12th, 1900.

Catocala nupta.—The unwonted abundance of this species during the last two seasons in this neighbourhood has been very remarkable. In August, 1899, it was so common, that at sugar one out of every two or three trees displayed a specimen. But this year it has been still more plentiful; and the telegraph-poles along the high roads have been adorned with it, many possessing one, two, or even three specimens of this fine insect high up at rest—easy to see, but not so easy to take, as at the first approach of net or bottle away flew skittish *nupta*.—(Rev.) A. Nash; Standish Vicarage, Stonehouse, Gloucestershire.

Acronycta alni in Herefordshire.—In the early part of August I received a larva of *A. alni*, which had been found on alder near here.—J. B. Pilley; Hereford.

Epunda nigra in Kent.—On Saturday evening, Sept. 15th last, I was sugaring in Barnet Wood, Bromley Common, Kent, with my friend Stanley Haines, of Bromley, when I had the luck to take *Epunda nigra* from the trunk of a pine which I had sugared. This is very uncommon, is it not, for this district, the insect being considered very local?—A. J. Lawrance; 8, Cross Roads, Bromley Common, Kent, Sept. 19th, 1900.

[We do not remember any recent record of the occurrence of *E. nigra* in Kent, but we believe that the species has been taken in the neighbourhood of Farnborough.—Ed.]

Plusia moneta at Norwood. — I took a magnificent specimen of *P. moneta* in my house on July 10th. — H. Wells; Hurstfield, The Avenue, Gipsy Hill, London, S.E.

Caradrina ambigua in Hampshire.—This species has been so abundant in my garden lately that I made a selection of over fifty specimens in one evening. The moths came to the flowers of clematis, and were then boxed, but they were flying around me in scores. Since that particular evening the species has not been nearly so abundant, and I am at a loss to understand why it should have appeared in such numbers one night, and the next and following evenings suddenly become comparatively scarce. I may add that *C. ambigua* has occurred in my garden for the past four or five seasons.—J. Hy. Fowler; Poulner, Ringwood, Sept. 3rd, 1900.

Coremia quadrifasciaria in Suffolk.—I have taken this species, but not frequently, by beating the undergrowth of hedges in Westerfield and Barham lanes, near Ipswich.—E. Sparke; 1, Christchurch Villas, Tooting.

Coremia quadrifasciaria and Melanippe procellata in Essex.—By way of supplement to the records of the Rev. G. H. Raynor and Prof. R. Meldola, I would like to say that in June, 1863, I captured a fine specimen of *Coremia quadrifasciaria* on the outskirts of a wood close to the town of Braintree. As to *Melanippe procellata*, this in 1879 and 1880 was fairly common in a lane leading from Witham to Rivenhall Thicks. I have records of several specimens captured in those years, and in the latter year I bred a great number from larvæ taken in that lane on *Clematis vitalba*.—W. D. Cansdale; Sunny Bank, South Norwood, S.E., Sept. 8th, 1900.

Spilodes sticticalis near Maldon.—Whilst working for *Colias* in a lucerne field near here, about 3 p.m. on Sept. 10th, I noticed a small moth hovering round a lucerne-flower. My surprise may be imagined when I found it on capture to be a specimen of *sticticalis* in very fair condition. An hour's subsequent work produced one more specimen, which I walked up out of the lucerne. Can any of your readers tell me whether the larva of this species has been found in England, and, if so, on what food-plant?—(Rev.) Gilbert H. Raynor; Hazeleigh Rectory, Maldon, Sept. 14th, 1900. [The larva is stated to feed on *Artemisia vulgaris* in June and July.—Ed.]

Limenitis sibylla in Surrey.—On July 22nd I saw a specimen of *L. sibylla* on the wing near Haslemere, and heard that several had been taken in the neighbourhood.—W. J. Lucas; Sept. 8th, 1900.

Sympetrum flaveolum.—*Sympetrum flaveolum* has been taken in one or two places. Odonatists should look out for it. The large amount of bright yellow can be seen on the wings when the insect is flying. Its flight is different from that of *S. striolatum*, with which it is generally found. It does not hover, but flits from plant to plant or from flower to flower something like a butterfly does. *S. sanguineum* flies in the same way; but *S. sanguineum* is also a fairly good capture. I may add that *S. flaveolum* is again present on Ockham Common, Surrey, and has been taken by myself and H. E. Annett. So far as I know, no females have been secured.—W. J. Lucas; 12, Caversham Road, Kingston-on-Thames, Sept. 8th, 1900.

Colias edusa and C. hyale in England, 1900.

It will perhaps be remembered that the abundance of *C. edusa* in the autumn of 1892 was foreshadowed by the occurrence of one or more examples of the species in various parts of the country at the end of May and the beginning of June of that year. In some of the localities *C. edusa* was accompanied in the autumn by *C. hyale*, but of this latter species very few specimens seem to have been noticed earlier in the year; only one record appears in the 'Entomologist.'

During the present year *C. edusa* was observed in June at Beachy Head, Sussex (12th); Devonport, Devon (22nd); Wiveliscombe, Somerset (23rd); Ringwood, Hants (23rd); and in a recent note Mr. H. O. Wells records a fine male specimen taken at Weston, Devon, on June 19th. Of *C. hyale* there is but one notice, but this mentions the capture of two specimens at Beachy Head on June 12th, and Mr. Colthrup informs us that he saw this species, as well as *C. edusa*, at Beachy Head about the middle of June last.

Berkshire.—On Aug. 13th I captured three specimens of this butterfly at Cumnor, Berks, and since that date have taken twenty (nineteen males and one female) flying over clover and along the roadside. I also obtained two *C. hyale* at Wootten.—Harold Thompson; Oxford.

During August my son and I captured twenty specimens of *C. hyale* and two examples of *C. edusa* var. *helice* in Berkshire, not far from Streatley.—(Rev.) Archibald Day; The Vicarage, Malvern Link.

Brecknockshire.—On August 18th I saw a specimen of *C. edusa* near Llangorse.—D. P. Turner.

Bucks.—I captured a female specimen of *C. hyale* and saw *C. edusa* in a clover field, also noticed a male of the first-named species on the railway embankment, at Chorley Wood, on September 13th last.—(Rev.) F. A. Walker.

I captured two specimens each of *C. edusa* and *C. hyale* on August 25th in a field of lucerne at Chesham.—D. Chittenden; 98, Court Hill Road, Lewisham, S.E.

On August 19th I counted six specimens of *C. edusa* flying over a field of lucerne near Beaconsfield. Not having my net, was unable to make any captures.—W. H. Bastow; The Poplars, Spencer Road, Grove Park, W.

Cambridgeshire.—On August 14th I saw near Pampisford Station a single *C. hyale* among a lot of *C. edusa*, and missed it. Returning to the same place next morning I had the pleasure of taking a fine male; and on the 17th saw three others, and took one, near Whittlesford. This locality yielded another on the 18th. Hitherto it has only appeared singly, but *C. edusa* has been fairly plentiful on the same ground.—E. G. Alderson; Pampisford Vicarage, Aug. 23rd.

Cheshire.—*C. edusa* has been fairly common about "The Cop" (river embankment) and adjacent clover fields on the right of the Dee below Chester. The first I saw was a fine female flying about a lucerne field, Aug. 17th. Up to to-day (Sept. 8th), when I obtained a male in very fair condition, quite a dozen, to my knowledge, have been captured, and others have been seen. The colleague of the butterfly, *Plusia gamma*, has been unusually numerous.—J. Arkle; Chester.

I saw one male specimen of *C. edusa* here (Burton), on September 6th, flying along the roadside.—(Rev.) C. A. SLADEN; Burton Vicarage, Chester.

CORNWALL.—*C. edusa* was very abundant at Bude, males preponderating. Also at Boscastle and Tintagel.—L. G. S. RAYNOR; 22, Gordon Place, Kensington, Sept. 13th, 1900.

DEVON.—A fine male *C. edusa* was taken at Weston, near Sidmouth, on June 17th, 1900.—H. O. WELLS; Hurstfield, Gipsy Hill.

C. edusa common almost everywhere. Have seen no *C. hyale* in my district, but have taken fourteen fine specimens of *C. edusa* var. *helice.*—(Rev.) W. J. LEIGH PHILLIPS; The Cottage, Parkwood Road, Tavistock, Sept. 17th.

During a visit to South Devon, from Aug. 9th to 18th, *C. edusa* was abundant at the following places:—Newton Abbot, Bovey Tracey, Starcross, and Dawlish, and with it the var. *helice* occurred sparingly. *C. hyale* was not seen.—A. H. HAMM; 52, St. Mary's Road, Oxford.

My friend Mr. E. Hill, of Lee, spent a few weeks at Ilfracombe, and in the course of four mornings' collecting took twenty *C. edusa* (seventeen males, three females) and no *C. hyale.* He said *C. edusa* was very common, as were also *Vanessa io* and *V. cardui,* of each of which he showed me about twenty examples. *Macroglossa stellatarum* was also common.—F. M. B. CARR.

C. edusa was common near Clovelly, Holsworthy, Crediton, Honiton, and Axminster.—L. G. S. RAYNOR, Sept. 13th, 1900.

DEVON AND CORNWALL.—On July 24th I noticed a couple of fine male *C. edusa* on the Cornish coast, a few miles west of St. Ives. The insect was fairly common during the second and third weeks of August at Taunton, sufficiently so to seem to point to a *Colias* "year." With the exception of one specimen seen last September, I am not aware of its occurrence there for the last seven years.—J. B. TETLEY; 5, Wilkinson Street, South Lambeth, S.W., Sept. 13th, 1900.

DORSETSHIRE.—On August 16th I found *C. edusa* very common along the coast between Abbotsbury and Bridport. I took one example of var. *helice,* and saw two other insects, which were either *helice* or *C. hyale.*—W. J. LUCAS.

C. edusa was present in large numbers during the early part of this week at West Lulworth, Dorset, where I took a good series of both males and females, the former being, however, much more numerous. I also took in the same place one specimen of var. *helice,* and two specimens of *C. hyale.* This last was far from common.—T. GODDARD WILLIAMS; The Neuk, Danehill, Sussex, Sept. 18th, 1900.

C. edusa was observed near Weymouth, Bridport, and Dorchester; not common.—L. G. S. RAYNOR; Sept. 13th, 1900.

ESSEX.—These butterflies have appeared in the clover and lucerne fields here—*C. hyale* in considerable numbers, but *C. edusa* has been rarer. I took my first specimen of each on August 2nd, and they have occurred almost every day until the present date. My boys and self have captured about thirty *C. hyale* and ten *C. edusa*, including a fine primrose var. *helice.* I have a considerable number of eggs from two female *C. hyale,* laid on white clover.—EDWARD A. FITCH; Maldon, Essex, Aug. 25th.

My earliest date of capture for each of these species was Aug. 11th. Since then up till to-day, August 18th, I have taken in various lucerne and clover fields round here thirty-four *C. hyale* and ten *C. edusa.* Most of them are in magnificent condition and evidently born on the spot, the only possible exception being a battered male *C. edusa*, which may have been "made in Germany." One of the *C. hyale* has two of its wings so deformed as to render its flight over here from the Continent quite out of the question; but its wings are not so badly deformed as in the case of one I took in 1875—within two hundred yards of the same spot—which could hardly fly at all. I have secured eggs of both species, *C. edusa* having paired in captivity.—(Rev.) GILBERT H. RAYNOR; Hazeleigh Rectory, Maldon, Essex, Aug. 18th, 1900. P.S. (Sept. 14th).—On Sept. 12th I came across twelve specimens of *C. edusa* and four of *C. hyale* on the railway banks near Felstead, Dunmow, and Easton Lodge.

C. edusa occurred in Epping Forest on Sept. 14th; also *Thecla betulæ*. I should be glad to know whether the latter insect is still considered common in our forest.—ERNEST CORNELL; 6, Vernon Road, Leytonstone.

A young gardener of a relative of mine came across at least five or six specimens of *C. hyale* in the corner of a field at Hatfield Broad Oak, and he succeeded in capturing a couple. This was nearly three weeks since.—(Rev.) F. A. WALKER; Dun Mallard, Cricklewood, N.W., Sept. 7th, 1900.

GLOUCESTERSHIRE.—*C. edusa* has been fairly plentiful in Gloucestershire. I have seen many specimens in the Vale of Berkeley, and have heard of many others. I also had the great pleasure of seeing a pair of *C. hyale*, male and female, flying close to me in the parish of Standish the first week of this month.—(Rev.) ALEX. NASH; Standish Vicarage, Stonehouse, Gloucestershire, Sept. 19th, 1900.

HAMPSHIRE.—I took a specimen of *C. edusa* at Milton on the cliff, and saw another on the shore near, on August 11th. During the next day or two a few were seen near Brockenhurst; while at the beginning of this week the species was common at Christchurch.—W. J. LUCAS; Aug. 17th, 1900.

C. hyale and *C. edusa* are both common here; a few var. *helice* have also occurred. The weather, however, is so bad just now that it has quite stopped collecting them.—J. HY. FOWLER; Ringwood, Sept. 3rd, 1900.

C. edusa was plentiful at Sway, Hants, while I was there, August 11th to 14th, and several specimens of var. *helice* and *C. hyale* were also caught. (Rev.) C. A. SLADEN; Burton Vicarage, Chester.

Both *C. edusa* and *C. hyale* are abundant here this year, and, curiously, the pale variety of the latter seems more numerous than the ordinary sulphur yellow form.—ALBERT MAY; Hayling Island, August 21st.

Whilst at Calshot Castle, a friend, H. Harrison, and myself took nine specimens of *C. edusa* (five males and four females). These were captured as follows:—July 30th, one; Aug. 1st, one; Aug. 8th, two; Aug. 10th, five.—H. E. ANNETT; Church Street, Walton-on-Thames.

C. edusa was seen in the neighbourhood of Andover, but very sparingly.—L. G. S. RAYNOR; Sept. 13th, 1900.

HEREFORDSHIRE.—On August 14th I saw two specimens of *C. edusa* near Peterchurch. Single specimens were seen on the 15th and 16th near Bredwardine.—D. P. TURNER; Sutton, Surrey, 1900.

C. edusa has occurred sparingly; the cold and wet weather during the first fortnight of August is probably responsible for its limited numbers in this district.—J. B. PILLEY; Hereford, Sept. 20th, 1900.

HERTFORDSHIRE.—Both *C. edusa* and *C. hyale* have been abundant. Here at Watford, near Boxmoor, and at Tring (on the Aldbury side of the railway), I have taken both species. *C. hyale* has been the more numerous of the two. In a clover field here I took one var. *helice*.—ARTHUR COTTAM; Eldercroft, Watford.

KENT.—I captured a worn specimen of *C. hyale* in the Warren at Folkestone on July 3rd last.—W. E. BUTLER; Hayling House, Oxford Road, Reading, Aug. 12th, 1900.

C. hyale is certainly much more common this year than I have ever known it to be before, for altogether, at different times, I have counted no less than twenty-seven on one small lucerne field, and eleven of these were netted. I have not seen *C. edusa* yet this season.—A. J. MANN; Lindenthorpe, Broadstairs, Aug. 13th, 1900.

My brother and myself were at Herne Bay the early part of this month, where we took *C. hyale*, which was in great profusion, and *C. edusa* in some numbers, flying over lucerne fields. It was surprising to see how the male *C. hyale* outnumbered its fellows. We only took eight females, although we could have captured any number of males; and out of a dozen or so of *C. edusa*, only two were females. We did not meet with var. *helice*, which we took here in 1892, when *C. edusa* was so abundant. My brother also captured a fine pair of *C. edusa* at Weymouth about June 15th.—G. ERNEST PEACHELL; High Wycombe, Bucks, August 26th.

On August 29th *C. edusa* were flying freely on railway banks at Whitstable, and on the same day I had the pleasure of taking eight freshly emerged *C. hyale* from a field of lucerne near Margate, where they were plentiful, but unfortunately kept to the centre of the field, and as a man was working there, I had to take them as opportunity offered. Journeying on to Folkestone, I found, on August 31st, that both *C. edusa* and *C. hyale* were plentiful, but worn. On Sept. 6th *C. edusa* and *C. hyale* were both flying on railway banks at Sidcup and Crayford; and on the 7th, when I went to the latter place specially to take them, not one was to be seen, although I saw them on the banks between Eltham and New Eltham Station as I passed in the train. By this it seemed they were gradually working up towards London. Railway banks seem to be a good medium for distributing them about the country.—C. W. COLTHRUP; 127, Barry Road, East Dulwich, S.E.

C. edusa is fairly common on the chalk-hills about Maidstone. *C. hyale* is very abundant, preferring the flowery meadows and waste places of the river valley (Medway).—J. L. SAXBY; Larkfield, Maidstone.

I obtained eight examples of *C. edusa*, six of *C. hyale*, and two of *Vanessa cardui* in a lucerne field situated between Hithergreen and Bromley on August 18th.—D. CHITTENDEN; Court Hill Road, Lewisham, S.E.

I noticed a male specimen of *C. edusa* in a railway cutting near Herne Bay on September 9th.—J. B. TETLEY; 3, Wilkinson Street, South Lambeth, S.W.

On August 17th I saw a specimen of *C. edusa* flying along the roadside near Cranbrook; and on the 20th of the same month I had the pleasure of seeing two specimens of *C. hyale* at Horsmonden. One of the latter was disporting itself in a field of mixed growth, among which was a good deal of clover in patches; the other was in a partly cleared clover field on higher ground. They both managed to elude the net, and flew away into adjoining hop fields, and I saw them no more.—RICHARD SOUTH; 96, Drakefield Road, Upper Tooting, S.W.

C. edusa is now (Aug. 23rd) out at Folkestone, flying along the cliffs below the Lees and at the Warren.—GEORGE W. OLDFIELD; 21, Longridge Road, Earl's Court, S.W.

My brother, Mr. F. Barton, took a fresh specimen of *C. hyale* on August 9th at Whitstable, and observed two others near Ramsgate a few days later. All were flying over clover fields.—W. H. Barton; The Poplars, Spencer Road, Grove Park, Chiswick.

While walking through a field yesterday near Hithergreen, I saw two specimens of *C. edusa*. I had not my net with me, or I could easily have captured them, their flight being very languid.—W. J. Harris; 17, Micheldever Road, Lee, S.E., Sept. 17th.

As far as I have had an opportunity of judging, I should consider this a *hyale* more than an *edusa* year. One *C. edusa* was seen at Chelsfield on August 31st, and on the same day eight *C. hyale* at Shoreham. On Sept. 5th a single *C. edusa* was seen on Blackheath; whilst two days later a trip to Birchington-on-Sea produced fifteen *C. hyale*, mostly more or less worn; about fifteen others were seen, but only one *edusa*. An excursion to Brasted, Sept. 11th, was not productive of *Colias*, a battered *C. hyale* being the only one seen.—F. M. B. Carr; 46, Handen Road, Lee, S.E.

Between August 11th and 17th last I captured at Hythe seventeen freshly emerged specimens of *C. hyale* and fourteen of *C. edusa*. Amongst the latter was a perfect example of var. *helice*, which fluttered up at my feet when I was crossing a stubble field. *C. hyale* appeared to be more plentiful than *C. edusa* in this locality. *Vanessa atalanta* and *V. cardui* were much scarcer than usual.—R. S. Mitford; 35, Redcliffe Square, South Kensington, Sept. 18th, 1900.

Middlesex.—Having heard that *C. hyale* and *C. edusa* were to be found at Chorley Wood, I went there on Sept. 7th, but failed in my quest. On nearing home, however, just before my train slowed previous to drawing up at Kilburn and Brondesbury Metropolitan station, I had the mortification to note first *C. hyale*, and a moment later *C. edusa*, both butterflies apparently in good condition, flitting along the north side of the railway embankment.—(Rev.) F. A. Walker, D.D.; Dun Mallard, Cricklewood, N.W., Sept. 7th, 1900. P.S.—Three specimens of *C. edusa* were seen by me on Sept. 13th on the railway embankment between Willesden Green and Brondesbury.

During the last three weeks two of my friends and myself have caught, at Potters Bar, seventeen specimens of *C. edusa*, sixteen of *C. hyale*, and one *helice*.—T. H. Grosvenor; Boundary House, Hadley, Aug. 26th.

Norfolk.—During August I took two examples of *C. edusa*, and the same number of specimens of *C. hyale*, on the cliffs near Mundesley, Norfolk.—S. W. Kemp; 80, Oxford Gardens, Notting Hill, W.

Oxfordshire.—*C. edusa* and *C. hyale* have appeared in some numbers this year near Oxford, and *Acherontia atropos* promises to be plentiful. Since August 17th I have netted eight specimens of *C. hyale* at Cowley, Oxon.—Harold Thompson; 31, Beaumont Street, Oxford, August 31st, 1900.

C. hyale is turning up in some abundance in this neighbourhood. I have myself taken four in a clover field at the foot of Watlington Hill on Aug. 17th. Six specimens were taken in the same field in 1893. I am not aware that the insect has been seen in the neighbourhood since; but this year I have seen it in three localities within five miles of this place.—(Rev.) John W. B. Bell; Pyrton Vicarage, Watlington, Oxon.

C. hyale and *C. edusa* have been fairly common here during August and September; the latter species being the more numerous of the two. A. H. Hamm; 52, St. Mary's Road, Oxford, Sept. 17th, 1900.

Shropshire.—I have had the satisfaction of once more taking *C. edusa*, an insect which I last saw alive at Torquay in 1876. I saw three specimens within three miles of this place on August 16th, and managed—though without my net—to capture two of them, a male and a female, both in good condition.—(Rev.) Chas. F. Thornewill; Calverhall Vicarage, Whitchurch, Salop.

Somersetshire.—I saw a splendid female *C. edusa* at Weston-super-Mare in August last. It settled on a flower, but as I was without a net at the time, I was unable to secure it.—Oscar Whittaker; Morelands, Heaton, Bolton.

The observations on the occurrence of *C. edusa* in Somersetshire were made either by my brother or by myself:—Two in the town, Weston-super-Mare, Aug. 17th and 27th; one near the top of Dunkery Beacon, Aug. 30th; one on Exmoor (Somerset side), Sept. 3rd; twenty seen from the train on the embankments between Minehead and Taunton, Sept. 5th. F. D. Blathwayt; Weston-super-Mare, Sept. 10th, 1900.

I spent the first three weeks of August at Bridgwater, and in a clover field near there we found *C. edusa* in fair numbers and very fine. Of ten females that we captured three were var. *helice*. We took only one *C. hyale*, and another was seen in the neighbourhood. *C. edusa* was also seen on the sand-hills near Brean.—Arthur Cottam, Eldercroft, Watford.

On August 11th I captured thirty *C. edusa* near Pilning; and on the 15th obtained twenty-four, and saw perhaps another hundred. I also obtained one var. *helice* and three *C. hyale*. *C. edusa* has been very abundant in the neighbourhood, visiting suburban gardens, where heliotrope seemed to be its particular fancy.—H. S. Bishop; 18, Cricklade Road, Bristol.

Suffolk.—My nephew took *C. hyale* on Sept. 4th at Southwold. Henry A. King; 25, Haringay Park, Crouch End, N.

Surrey.—On July 30th I saw, in a field at Worcester Park, Surrey, a specimen of *C. hyale*, but, having no net, I of course failed to catch it. C. W. Colthrup; 127, Barry Road, East Dulwich, S.E., Aug. 1st, 1900.

On Sept. 5th I went to a clover field between Cheam and Ewell in search of *Colias*. Between about 12.30 and 1.30 I took six *C. hyale*, and saw several more. I stayed quite an hour after this, but did not see another specimen, nor did I see any *C. edusa*. On the 6th I went to the same field again for a short time in the middle of the day, the only result being the capture of one *C. hyale* and one male *C. edusa*. No other specimens of either were seen. On Sept. 11th, after trying another tract of clover without success, I returned to the same place; five *C. edusa* were captured, four being males, but no *C. hyale* were seen. Two of my specimens of *C. hyale* are very small. A friend took a specimen of *C. hyale* at Belmont in August.—D. P. Turner; Sutton, Surrey, 1900.

I have seen a specimen of *C. edusa* flying in a garden here this season, and have captured a *Macroglossa stellatarum* in the same place.—J. C. Warburg; Albury, Surrey, Sept. 9th, 1900.

I saw more than one example of *C. edusa*, on July 31st last, in a clover field some little distance behind Box Hill Station.—G. Sparke; 1, Christchurch Villas, Tooting.

One example of each sex of *C. edusa* was taken on August 11th on the Hogg's Back, about half-way between Guildford and Farnham; and I know for certain that two specimens have been seen at Walton-on-Thames. H. G. Annett; Walton-on-Thames.

Within a two and a half mile radius of Newdigate I found *C. hyale* and *C. edusa* flying about over four clover fields; they were not plentiful, but they were in fair numbers. I caught about twelve *C. hyale* and twenty *C. edusa*. Some friends whom I took to the localities captured about five of each. I doubtless could have got many more had I had the time. I saw a few *C. edusa* on the road between Horley and Three Bridges. From August 10th to the 20th they were most plentiful; but I saw a few yesterday (Sept. 6th).—HERBERT BEADNELL; Fernside, Redhill, Surrey, Sept. 7th.

The only specimen of *C. edusa* that I have seen near here was one at Puttenham on Sept. 6th.—W. J. LUCAS; 12, Caversham Road, Kingston-on-Thames.

SUSSEX.—Whilst collecting at Arundel last Sunday, Aug. 19th, I saw four specimens of *C. edusa*, two of which I captured, both males; they are in beautiful condition. I also took one *V. cardui* the same day, and one *P. monacha* at rest on a beech-tree. On August 26th I took a fine male specimen of *C. hyale* flying by the roadside near Arundel.—HENRY E. GARRETT; 3, Brewer's Green Mews, Victoria Street, Westminster, S.W., Sept. 14th, 1900.

I saw ten examples of *C. hyale*, of which I took four very fine specimens (three males and one female), on the downs behind Gompting, between August 16th and 18th; they were confined to a small stretch of the downs, about two hundred yards long, bordered by a thick hawthorn hedge. *C. edusa* was very abundant in a cornfield, about a quarter of a mile away from the above locality. It also occurred plentifully in many localities within a five mile radius of Worthing.—H. WORSLEY-WOOD; 31, Agate Road, West.

C. edusa and *C. hyale* were common in clover fields around Hooe, near Pevensey, in the latter half of August. I took nine specimens of the last-named species, and one example of *C. edusa* var. *helice*. I may mention that last year I captured seven specimens of *C. hyale* near Broadstairs, and two *C. edusa* at Sidmouth.—LEWIS L. TURNER; 131, Melbourne Grove, East Dulwich, S.E.

C. hyale has been the butterfly of the year in this locality. My brother, Mr. Frederick Anderson, has taken many fine specimens, and three or four have also been captured by my friend Mrs. Fogden at Apuldram during the first fortnight of August. My brother also took a beautiful example of var. *helice* here on August 17th. Although *C. edusa* has been, and is, at the time of writing (August 20th), very abundant, some visiting the garden even, this is the only specimen of var. *helice* of which I have cognizance in this neighbourhood.—JOSEPH ANDERSON; Chichester.

I found both species very abundant near Littlehampton, August 10th to 20th, taking forty-eight *C. edusa*, one var. *helice*, and eighty-four *C. hyale*, besides seeing many more.—RUSSELL E. JAMES; 18, Onslow Gardens, Highgate.

WESTMORELAND.—I had already penned a note on *C. edusa* to the effect that five male specimens had been caught, and others seen, during the latter part of August; but I now have the pleasure of being able to record that it is being taken in considerable numbers amongst the clover and stubble of a cornfield recently cut close to Kendal. Though it is a revelation to me, there is not the slightest doubt that the specimens now being caught are the progeny of immigrant females, all being in perfect condition, and one or two having been taken with the wings still limp after emergence. It is some years since the species has been noticed in the district. On Sept. 12th and 13th I caught thirteen at Ford, near Shrewsbury, but they were somewhat worn.—(Rev.) A. M. Moss; 12, Greenside, Kendal.

Wilts.—*C. edusa* and one specimen of *C. hyale* were seen near Salisbury.—L. G. S. Raynor; Sept. 13th, 1900.

RECENT LITERATURE.

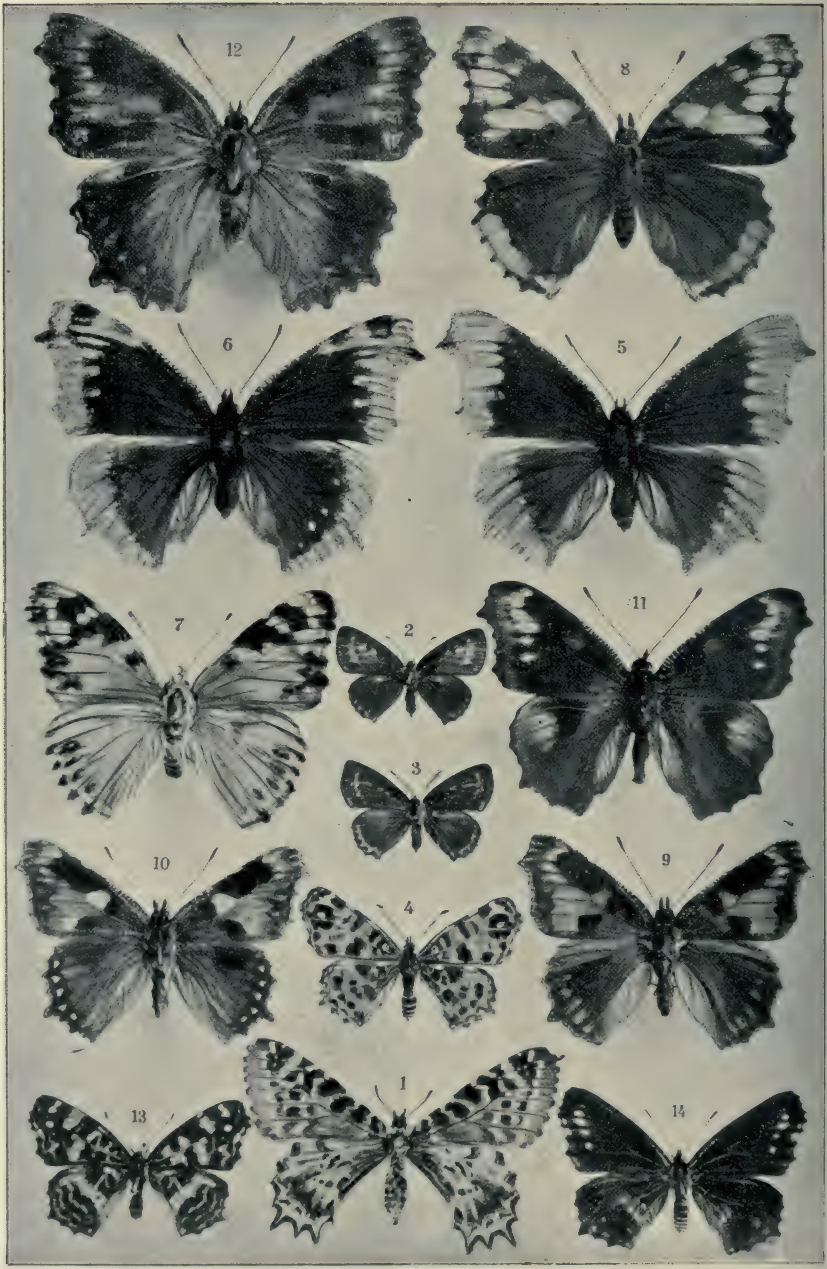
Insecta Transvaaliensia; a Contribution to a Knowledge of the Entomology of South Africa. By W. L. Distant, author of 'Rhopalocera Malayana,' &c.; assisted by many Specialists. Published by W. L. Distant, Highfield, Upper Warlingham, Surrey. Part I. June, 1900.

During his four years' residence in the Transvaal—the preliminary results of the earlier part of which were published in one of his other works—Mr. Distant paid much attention to Entomology, and formed a considerable collection of insects. The work before us is expected to extend to twelve quarto parts, each containing twenty-four pages of letterpress, with two coloured plates; and three parts are promised annually till the whole is completed. It is proposed to enumerate all the species described from the Transvaal, and the book will contain descriptions and figures of a large number of new species. While not ignoring the work of others, it will be based chiefly on Mr. Distant's own collections; and the uniformity of the African Fauna, from the Cape to the Zambesi (and, Mr. Distant might have added, of all Eastern, Southern, and Central Africa, to Somali, Abyssinia, and the Lake District of Central Africa), will make the book of great value for the elucidation of the Entomology of Southern and Eastern Africa generally.

The first part contains the commencement of the *Orthoptera*, comprising the letterpress descriptive of the *Forficulidæ*, and the commencement of the *Blattidæ;* and two plates, one devoted to the two families already mentioned, and the other to the *Phasmidæ.* These have been carefully drawn by Mr. Horace Knight, under the supervision of Mr. Distant himself. There is a very full account of the habits, &c., of *Forficulidæ* and *Blattidæ* by Mr. Distant, and of the distribution of the Ethiopian species by Mr. Malcolm Burr. The systematic portion is by Mr. W. F. Kirby, and the descriptions of the new species have previously appeared in the 'Annals and Magazine of Natural History.' The *Blattidæ* figured exhibit a variety of form and colour which many people would hardly expect in "black beetles." The number of apterous species, or species with apterous females, is very considerable in Africa, and thus the dissimilarity of the sexes in African *Blattidæ* adds considerably to the difficulties of their study. The plate of *Phasmidæ* also exhibits a variety of interesting species, two of which are remarkable for the curious appendages on the head.

We believe that the second part of this meritorious work will be devoted to Moths.

W. F. K.



After Obernetter. *By permission of Frankenstein & Wagner.*

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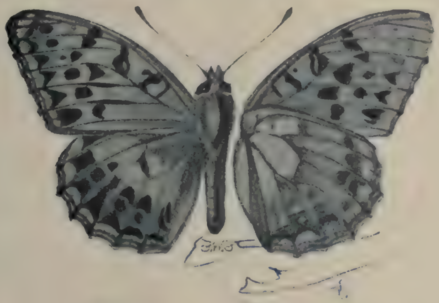
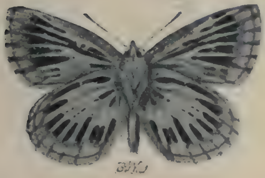
TWO ABERRATIONS OF BRITISH BUTTERFLIES.





Argynnis adippe, ♂ (upper figure).—Taken in Kent, on July 17th last, by Mr. R. S. Mitford, to whom I am indebted for the loan of the specimen to figure. Mr. Frohawk's drawing so admirably exhibits the aberrant characters of this pretty variety, that it is only necessary to say that the under surface of the hind wings is buff in colour, and the submarginal series of spots reddish brown; the large spots on basal area are silvery, and there are two or three silvery markings towards the anal angle. A somewhat similar aberration of the female of this species (*A. aglaia* in error) is figured Entom. xv. pl. i. figs. 2, 2*a*, pp. 50, 142.

Lycæna bellargus, ♂ (lower figure).—Taken at Folkestone during July last. The under surface is whitish clouded with grey, and there are orange lunules at the outer extremities of the black bars on hind wings. Mr. Sabine, who has kindly lent the specimen for figuring, states that it was captured by Mr. Barlow, whilst he was netting a few *L. bellargus* for a friend in London. This aberration is parallel with one of *L. icarus* figured by Newman, Brit. Butt. p. 128.

Richard South.

NOTE ON THE OVIPOSITION OF *PARNASSIUS APOLLO.*

By T. A. Chapman, M.D.

The keel or pouch of female *Parnassius* seems now to be well understood as a structure added by the male during pairing, but what its use is seems to be still quite unknown. At least, I can find no satisfactory observation or suggestion on the matter. One surmises that it must be of some use in ovipositing. I made a point on several occasions this summer of watching *apollo* to detect the mode of oviposition, if possible. I only succeeded in seeing one egg laid, and that I could not find on searching. The way in which it was deposited was, however, very suggestive. The butterfly alighted on a dead stalk, some six or seven inches above the earth, not on or very near any *Sedum*, and then ejected an egg in such a forcible way that it fell, perhaps, an inch and a half away from the spot immediately beneath the insect. A solitary observation is, perhaps, too small a basis to theorise on; but, as the egg lies unhatched all winter, the object would be to send it with some force, so that it would get into some sheltered corner. The mode by which the jerk is communicated would probably be by the egg being pressed against the pouch, the elasticity of which would give it a jerk when it slipped free. The egg has a flat base, by which it probably becomes attached when that surface touches any object.

In searching for any account of the oviposition of *Parnassius*, I find perfunctory allusions to it, implying that there is nothing unusual in method of egg laying. The fullest reference I find in W. H. Edwards's account of *P. smintheus*, where several different observers note the butterfly as laying freely on various objects, and especially on anything in preference to the food-plant. He quotes two observers who *saw* the butterfly laying eggs, and who note nothing peculiar about it. It may be, therefore, perhaps, that my observation was of an unusual occurrence—it suggests the desirability of further observations.

Betula, Reigate: Sept. 1900.

SYNOPSIS OF EXPERIMENTS IN HYBRIDIZATION AND TEMPERATURE MADE WITH LEPIDOPTERA UP TO THE END OF 1898.*

By Prof. Dr. Max Standfuss.

Plate II. (Entom. Plate VI.).

(Continued from p. 167.)

5. On rare occasions aberrations were produced by these warmth and cold experiments, *i.e.* forms arose, which, although not confined to any particular season or locality, are found as great rarities in a state of nature sporadically all over the district inhabited by the species in question, either in similar forms or near approaches thereto; forms were also obtained by these experiments which should no doubt be included in this category, but which have not yet been discovered in a state of nature. We shall return to the nature of these forms later.

For example, by means of cold an eyeless form of *Vanessa io* was obtained; also characteristic aberrative forms of *V. urticæ* and *V. polychloros;* and by warmth, *V. antiopa* occasionally developed a very much broadened yellow border, *V. cardui* and *V. polychloros* also giving rise to aberrations.

These aberrations were more generally obtained when the effect of the warmth and cold experiments were especially extreme; so that, on account of these observations, I came to the conclusion, as long ago as 1894, in my pamphlet, "The Causes of Variation and Aberration in the Imaginal Stage of Butterflies" (Ent. Zeitschr. Guben, 1894, Sept. 15th, pp. 102, 103):—"Therefore it is highly probable that a large number of the aberrations found in a state of nature, the reasons for whose occurrence has hitherto been unknown, have been caused by abnormal temperature conditions, which affected the pupal stage"; and that it would appear to be necessary to complete the former experiments by introducing temperatures of over + 40° C. and under 0° C. In fact, the results of these further experiments were correctly foretold by me in the year 1895 in the large Handbook, pp. 291 and 292, before these experiments were in any way commenced. The results obtained confirm these predictions in the highest degree.

We now come to the second series of temperature experiments—heat and frost experiments.

The temperatures used, + 40° to + 45° C., on the one hand, and 0° to −18°—occasionally −20° C.—on the other, were, as already stated, only intermittently applied, as they could only be borne for short periods (in most of the many experiments for two periods per day of two hours each for three to six days); between the exposures and after same, and until emergence, the pupæ were kept at the ordinary daily temperature. In the heat and frost experiments the greater part of the material experimented with remained unchanged; only the smallest proportion of them departed in any way from the normal type, and, most curiously, this portion was of equal value in both heat and frost experiments. The same or almost similar forms were obtained at −15° to −20° C. as at +40° to +45° C., that is, in both aberrations arose. These strange results lead to the question—In what way do these frost and heat experiments work?

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* Translation continued by E. M. Dadd.

Observation shows that if a large series of pupæ be exposed for two hours twice a day for three days in the frost apparatus to a temperature of about − 12° C., the imagines were not delayed only the six hours, during which the pupæ were in the frost apparatus, but were delayed days. It is also remarkable, that by substituting +44° C. for −12° C. analogous results were obtained. High temperatures by no means hasten matters, as one would be inclined to suppose, but mostly interrupt the development, often delaying the same long over the extent of the time of exposure.

This retarded development under very high temperatures was most noticeable when a species, whose one generation hybernates as pupæ, had the pupæ of its summer generation submitted to about + 44° C. Then a certain proportion of the pupæ do not emerge as a second generation, but hybernate, and give the following spring imagines of the normal type of the first generation. This took place with broods, the remainder of which, left under normal conditions, emerged all in the second generation. The interruption in the development became in this case permanent, and the forced æstivation passed directly over into the normal hybernation of the following generation. It may also be mentioned here, which is under the circumstances more comprehendable, that in frost experiments with summer pupæ of species with two generations, a certain percentage according to the degree and length of the frost action do not reach a second generation, but hybernate.

We have thus to first answer the question—How do these frost and heat experiments work? They arrest development, and put the insect into a state of lethargy, whereas there were no such interruptions in the warmth and cold experiments.

But a further important difference exists between these two series of experiments. Cold and warmth experiments resulted in a change in the whole of the material under different treatment in different directions and degrees, whereas with uniform treatment a certain line is always followed without much variation between individuals.

A specific line of development such as was obtained by cold experiments was never evolved by the same species by warmth experiments, nor was the obverse ever obtained. It was plainly a case of direct influence.

It was very different with frost and heat experiments. In this case the whole of the material experimented with was never influenced in one direction differing from the normal type. Firstly, it must be remembered that it was the rule for the greater part to remain unaltered in any way; secondly, among those that were influenced, even though, for certain individual groups, a number of regularities were observable in the variations, yet the one group as compared with another would often enough vary in an entirely different direction, even in one and the same experiment. Moreover, at minus temperatures, after a certain limit had been reached even at great divergences—for example, −8° to −18° C.—qualitatively the same variations were obtained, although not in the same percentage; this was also the case with extreme degrees of heat. In the cold and warmth experiments, on the other hand, a very few degrees were sufficient, if constantly applied, to create vastly different forms. We even find that the influence of heat on certain species of *Vanessa* will solely produce forms which are certainly equivalent to certain forms obtained by frost experiments, as the differences which up to the present could be detected between aberrations obtained by the influence of heat and certain aberrations obtained by the influence of frost are overborne by the preponderance of similarity in the structure of these two forms, and may perhaps be entirely removed by further studies.

From all these facts it follows that the second answer to the question, "In what way do these heat and frost experiments work?" is:

They have no direct influence, but indirect, owing probably to the fact that through the state of lethargy brought about by them, conditions act which cause a variation in the future insect in a particular direction; and it is quite immaterial for the setting up of this line of development whether the period of lethargy is caused by frost, by heat, and perhaps also by any other hindering influence.

Now, what deductions do we draw from the aberrations? What can we think of them? We have as yet given no explanation of them, but only indicated that they are forms which, although not confined to any locality or time of appearance, are found in a state of nature, generally as great rarities, here and there in the territory inhabited by the species. This says nothing as to their real essence.

If only certain species of the genus *Vanessa* had been used for analysing this problem, it would have been on a casual examination a tempting speculation to suppose, taking as a basis certain highly darkened aberrative forms resembling each other, that aberrations were retrogressions in the direction of an ancient type, having characteristics common to these species. There are, however, such important reasons against the acceptance of this view that it certainly cannot be correct. One of these reasons is that in these aberrations the males are not only much more numerous than the females, but are also inclined to the most extreme development; whereas we know by experience that the female sex is far more inclined to atavism.

The most important reasons which preclude the possibility of the variations being atavistic are grounded on phylogenetic considerations. In considering the genus *Vanessa* and the related nymphalids *Argynnis* and *Melitæa*, we must reach the conclusion that this is not a case of primarily black or dark-coloured ground colour and secondary light brown and yellow, which would be the result if we were to consider these darkened aberrations as atavisms, but, on the contrary, primarily yellow or light brown ground colours with secondary superposition of darker markings. We have right amongst palæarctic Vanessidæ two species which show the phylogenetic progress from light brown ground colours with dark markings to a predominating dark brown ground colour in a seasonal dimorphic form, viz. *V. levana*, L., and the related Siberian *V. burejana*, Brem.

If, however, the aberrations cannot be considered as forms tending in an atavistic direction, what are they?

Regarding the influence of the experiment, they cannot be considered as the direct result of this influence, but solely as a frequent but by no means constant accompaniment. The direct result of the experiments is lethargy, interruption of the development, at a stage of life-history when important changes in the structure of the body have naturally a fundamental influence on the colour garb of the imago. These interruptions destroy the continuity of the normal development, which holds, so to speak, the individual fettered, driving it forward in a certain direction; when the further development continues, a portion of the individuals—in fact, the majority—continue in the usual direction; a few, however, diverge from the normal direction of development, as if thrown off the rails by the interruption.

It is therefore a case of a relatively independent progressive development of the individual, and therefore with a stamp of great variation between individuals. The aberrations therefore indicate, firstly, individual colour anomalies in a new direction (at least in most cases).

But still another side of their character presents itself: if we compare them with the types, which in the cold and warm experiments were proved undoubtedly to be the direct results of these moderate high and low temperature influences, we find that a considerable number of the latter actually exist as local or seasonal forms, or that the variation lies in the line of the phylogenetic development of these forms, backwards or forwards. This is quite the reverse of the aberrations: they diverge entirely from such lines of development, and—this seems to be the second peculiarity of the character—do not vary on the lines of the normal line of the phylogenetic development of the species.

It was certainly not the sole purpose of these heat and frost experiments to obtain aberrations, but by this means to follow up two questions of scientific interest, and if possible to answer same.

Firstly, what factors in nature cause the appearance of aberrations, which as to their appearance in free nature and characters form such obscure problems? And secondly, are these new forms; is the aberrative coloration transmitted to the progeny? In order to answer the first question, the experiments were conducted in a methodical manner.

Whoever carefully investigates large and the largest collections, cannot deny the fact that aberrations appear in years with many strong temperature variations, or from localities in which sharp changes are a common occurrence; for example, in certain mountain valleys, particularly in the Alps.

Perhaps the true reason is to be found in the important and lasting reduction of temperature caused by storms, especially when accompanied in flat regions by hail, and in mountainous regions by snow-storms; at least this appears to be the conclusion to be drawn on the one side.

Experiments were therefore made with 0° and −2° in various ways, so that the most extreme variations of temperature which could happen in such cases should be imitated; but the result of all these experiments was absolutely nil, in spite of the large number of individuals dealt with.

Only by the repeated application of −5° were a few aberrations obtained.

It is apparent that a repeated occurrence of −5° during the warmer portions of the year is out of the question. Still less a repeated occurrence of −8°, −9°, −12° C., &c., under which conditions experimental aberrations were constantly obtained, although only few in number. Another fact which must be well borne in mind, is that this result was only obtained with species whose whole life-history from ovum to imago is achieved during the warm portions of the year, and which hybernate as imagines; but this was not the case, at least as far as present experiments have gone, with species which hybernate in the larval stage.

One must now consider the alternative as to whether the aberrations are caused by extreme high temperatures.

In these experiments, conditions which could possibly happen in nature were, as nearly as possible, adhered to, and in this case the experiments * were not without result, although much less material was used.

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* In 1898 the heat experiments were continued in great numbers with + 42° to + 44° C.; firstly in January and February with hybernated pupæ of *Papilio podalirius*, L., *P. machaon*, L., *Thais cerisyi* var. *deyrollei*, Obthr., *Polyommatus amphidamas*, Esp., and *Vanessa levana*, L. I was successful in obtaining a few aberrations *sensu strictiori* of all these species. *Thais* v. *deyrollei* produced especially striking forms.

Plate I. fig. 7 shows an aberration of *Papilio podalirius*, L. (hybernated pupæ from Sitten, Canton of Valais) thus obtained, which shows an increase in the dark markings in some place on the fore wings in a blurred manner. The black markings both on the upper and under sides of the fine female *Thais* var. *deyrollei*, Obthr. (Pl. I. fig. 9), are also very much increased over the normal form. This aberration was frequently obtained by the heat experiments. The female of the Amasin local form of *Thais cerisyi*, B. (Pl. II. fig. 1), is not so much darkened, but still differs a good deal from the ordinary form. Pl. I. fig. 10, and Pl. II. figs. 2 and 3, show abnormal coloured specimens of *Polyommatus amphidamas*, Esp., from hybernated pupæ from Leipzig, also in increased darkening; the under sides of these individuals show a partial lengthening of certain rows of spots into rays.

In contradiction to the above-named aberrations of Papilios and *Polyommatus amphidamas*, a Lycænid; the nymphalid *V. levana*, L. (Leipzig), shows a reduction of the black brown markings; as will be seen (Pl. I. fig. 11, and Pl. II. fig. 4), at least as far as these heat experiments with hybernated pupæ go, I could not obtain opposite variations, or, in fact, variations in any other direction. The males of *Thais* var. *deyrollei*, Obthr., in apposition to their females, showed an inclination to a reduction of the dark markings, which will be seen by Pl. I. fig. 8).

These experiments filled up a considerable blank in the former ones.

From May until August a continuation of the heat experiments was made with summer pupæ.

V. antiopa, L., resulted in a number of ab. *hygiæa*, Hdrch., as well as intermediate forms; two characteristic specimens of these forms are shown (Pl. II. figs. 5 and 6).

According to present experience, these aberrations were most frequently attained by a temperature of + 42° to + 44° C. applied three to five consecutive days, four times a day, each application lasting one hour; the best result was seven aberrations among forty individuals. The change from daily temperature to heat, as in all these heat experiments, was sudden, as also the return to ordinary temperature at the conclusion of the application.

V. cardui, L., produced two ab. *elymi*, Rbr., one of which is shown (Pl. II. fig. 7); *V. atalanta* a typical ab. *klemensiewiczi*, Schille (Pl. II. fig. 8), and an intermediate.

Several very extreme forms of ab. *ichnusoides*, Sel. Long., were obtained from *V. urticæ*, L., as well as intermediates; a specimen of the first is figured (Pl. II. fig. 9), and an intermediate (Pl. II. fig. 10). *V. io*, L., produced a few ab. *belisaria*, Obthr., very highly developed from individuals of the second generation from Zürich (Pl. II. fig. 11). *Vanessa* var. *prorsa*, L., in all the large series exposed produced, first, as the earliest emergences of

It is sufficient for a pupa, of species not only hybernating as imagines, but also as larvæ, to be submitted to a temperature of +42° to +45° C for two hours, on two, three, or four consecutive days, while it is in a sensitive stage, to eventually produce an aberration.

This will most easily happen in steep mountain slopes or on the face of cliffs, but it might also happen on dark tree trunks, boards, stones, or under leaves, which lie close to a good heat conductor. In breeding, also, pupæ which are placed in a greenhouse or other outhouse, or even in a room, where the sun can reach them, may be subjected to a similar temperature, which is a very natural explanation of the extraordinary aberrations which are bred now and then to the great wonder of the entomologist.

One point which confirms the validity of this explanation of natural aberrations is, that the aberrations hitherto obtained by the heat experiments all correspond to those found in nature, whereas the aberrations resulting from frost experiments are often forms which have probably never been observed in a state of nature. In order to show the conformity of heat forms with those found on nature, compare the experimentally obtained aberrations figs. 2, 4, 6, 8, with the natural forms 1, 3, 5, 7, which are placed side by side on Pl. IV. of 'Experim. zoolog. Studien.'

The results of these heat experiments * allow the conclusion that the typical aberrations of the nymphalids, that is, about 80–90 per cent. of all known aberrations, are brought about in a state of nature by the occasional action of high degrees of heat, +40° to +45°.

And now for the last question raised by these temperature

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each brood, only normal v. *prorsa*, L., but later on ab. *porima*, O., and very sparingly, several aberrations in very different directions of development (see Pl. II. figs. 13 and 14). The original of fig. 14 is such an extraordinary individual that one does not know at first to what species to relegate it. Each series ended, generally after a pause, in several very large typical *levana*. A number of pupæ stood over and produced in the spring of 1899 thoroughly typical *V. levana*, L.

The experiments with *V. polychloros*, L., were not continued in 1898, as a number of fine ab. *testudo*, Esp., were produced in the heat experiments of 1897 (*cfr*. Exp. zool. Stud. Pl. IV. figs. 2 and 9). A female of the latter is shown (Pl. II. fig. 12), as females of this beautiful aberration are very hard to obtain through these experiments in faultless condition and in such extreme development can hardly be known in a state of nature.

* As the continuance of the heat experiments in 1898 shows (compare the previous footnote), the conclusion arrived at as to the cause of aberrations *sensu strictiore* in nature of the nymphalids is not only confirmed by further results, but is also shown to be true for a number of Papilionidæ and one Lycænid (*Polyommatus amphidamas*, Esp.), so that a general agreement seems probable.

experiments. Will the new forms which have been obtained by these experiments be capable of reproduction?

Qualitatively, the best material for this purpose would be the above-mentioned phylogenetic progressive forms obtained by these warmth and cold experiments. Their coloration has undoubtedly been directly influenced by the experiment, and the forms in question, having never been noticed in a state of nature, they are individuals with acquired new characters.

The use of these forms has, however, as far as the present experiments have gone, been prevented, as the individuals obtained have never shown sufficient energy; they had certainly suffered by the experiment.

Especially the most extreme forms, which would have been most fitted for these heredity experiments, had generally badly developed wings; blood oozed from several places, so that they were absolutely useless for the purpose of continuous flight. Besides the wings, the claws on the feet of the extreme forms were, as a rule, badly developed, and absolutely useless for holding on with. One was therefore reduced, on the one hand, to the coloration anomalies and aberrations, which were only an indirect result of the influences applied, but whose anomalies, on the other, never occur without such experimental influences amongst countless thousands of individuals, and which constitute, like the first, new forms, only with greater individual differences, and partly in quite different directions.

The experiments showed that only the frost experiments produced a great number of these forms with full energy, so that only material obtained by this means was used for the experiment. Further, it seemed advisable to first make these experiments with the *Vanessa* species feeding on nettle, on account of the comparative ease of cultivating large quantities of this plant in large pots. *V. c-album*, *V. urticæ*, *V. cardui*, and *V. atalanta* were all equally serviceable; they all live, as a rule or occasionally, on nettle, and, moreover, these species were especially suitable, as in our latitude they constantly occur in two generations.

Finally, I was unfortunately only able to get a sufficient quantity of imagines for this experiment of *V. urticæ*, in all from not less than 8231 pupæ.

Sufficient room for the experiment was kindly placed at my disposal by Herr Dr. G. Stebler, in a portion of a growing-house for the Seed Control Station. Good ventilation was assured by replacing some of the panes of glass by wire screens.

Four immense tubs and other articles containing full-grown nettles, which had been cultivated the previous year, as well as a lot of pots containing flowering pinks, completed the furnishing of the small room, to which the sun had good access. Arrangements were also made for shading appropriately portions of the room.

On Whit Monday, June 7th, 1897, the first abnormal *V. urticæ* were introduced, and so on until June 15th—in all forty-two specimens, thirty-two males and ten females.

The males were without exception very extreme forms, with entirely black hind wings on the upper side; only two females belonged to this form, the remaining eight possessed blue marginal spots, and partly also more or less brown ground colour at the anal angle of the hind wing; certainly a very small number of females, when one considers that they formed the entire female aberrations from more than eight thousand pupæ.

It was interesting to note during the following weeks how quickly the small creatures accustomed themselves to their keeper, and lost all their fear of him, and how in certain directions they exhibited intelligence and remembrance; for example, immediately on his entry into the breeding house they fluttered to the ground, as they had quite apparently noted that his entry was symbolical of a drink, as, to take care of their thirst, I was in the habit of sprinkling the ground with water.

The 25th of June had arrived, and, in spite of the most careful observation, no pairing was noted, but the room was only visited between the hours of 8.30 a.m. and 7 p.m.

All kinds of love-games were indulged in, but, as already said, no real pairing. It must, however, have taken place, as, on June 26th, I was pleased to see a cluster of eggs on the under side of a nettle-leaf, and during the following days eight females, amongst them the most abnormally coloured ones, were observed laying eggs. How many eggs were laid by each female on an average could not be ascertained, as for many days one after another they were laid on different leaves. It cannot, however, have been less than two hundred, as more than two thousand larvæ developed, in spite of the fact that two of the ten females met an untimely end through spiders. Among them, unfortunately, was the less extreme of the two extreme forms.

Probably she had laid no eggs, as the ovarium was full of eggs, and she was never observed ovipositing. From July 2nd the larvæ emerged, and at first were allowed to feed freely on the nettle, but were later on placed in airy breeding-cases. The brood of the most abnormal female was kept separate, and reared from the commencement by itself.

Unhappily, one of the many infectious diseases known under the collective name of *Flacherie*, shortly appeared, so that of all the broods only the strongest and most quickly developed individuals reached the pupal stage: in all, 493 specimens. These did not all produce imagines, as some were attacked by ichneumons, *Pteromalus* sp., and others, died of the disease in this stage.

The brood of the most abnormal female, reared with the greatest care, produced only fifty-two pupæ, which are included in the 493 before mentioned.

On July 21st the imagines emerged till 27th, altogether two hundred specimens; amongst them the first specimens of the brood of the most abnormal female. All these specimens were entirely and thoroughly normal. On July 28th appeared one variety (*cfr*. Exp. zool. Stud. pl. v. fig. 4), and on July 31st and Aug. 1st, each one more, differing from the normal form, but not very abnormally. On Aug. 5th, among the last imagines from this experiment, a very aberrative specimen emerged (*cfr*. Exp. zool. Stud. pl. v. fig. 5), as the previous three, also the progeny of the most abnormal female. It was also a male.

The result of heredity experiments with abnormal forms obtained by the frost experiments—the whole material from emerged imago through egg, larva and pupa to imago being treated as far as is known to perfectly normal conditions—is as follows:—

1. Two of the ten females experimented with did not produce offspring.

2. The small portion of the broods of probably seven females which reached maturity reverted entirely to the normal form.

3. An eighth pair, from which only forty-three specimens were obtained, resulted in one well and three slightly developed aberrations, in the direction of the parental aberration.

4. These four individuals are all males.

5. Only the most abnormal female—the thirty-two males, as already stated, were about of equal merit as far as their abnormal characters are concerned—transmitted its newly acquired characters more or less to a small portion of its offspring. The possibility of transmitting these anomalies seems to be conditional on the extent of the anomaly.

6. As this experiment, on account of the outbreak of disease, was very incomplete, it is desirable to repeat same again, with plenty of material.

However, the facts obtained may be considered of great importance for estimating the influence which natural factors contribute to the alterations of living organisms, especially when one considers that the same individual which we have here produced from the brood of abnormal parents never occurs amongst countless thousands of creatures of normal parentage, which have been subjected to exactly the same conditions.

(To be continued.)

NOTES ON SOME SINHALESE RHYNCHOTA.

By G. W. Kirkaldy, F.E.S.

Fam. Tetigoniidæ [=Jassidæ, auctt.].

Nirvana, gen. nov.

Belonging to subfam. Jassinæ. Head porrect, plane, nearly twice so long as pronotum, the lateral margins parallel so far as ocelli, subsequently very gently convergent, apex subangular. Eyes longer than wide, produced basally over the anterior margin of the pronotum, which is somewhat wider than the base of the vertex; ocelli small, indistinct, situated on the lateral margins of the vertex, at about half their length from the base. Posterior margin of head concave; frons slightly concave. Antennæ simple, very long. Scutellum slightly shorter than pronotum. Anterior coxæ free. Type *N. pseudommatos*, Kirkaldy.

The only example of the typical (and only) species that I have seen is macropterous; the tegmina and wings are longer than the abdomen, but the neuration is very feeble. The claval suture is well marked, though it ends abruptly just before it should reach the lateral margin of the tegmen; there are no other tegminal nervures except three indistinct longitudinal on the membrane (which is not sutured off from the rest of the tegmen). *Nirvana* may be placed provisionally near the American genus *Spangbergiella*, Signoret.

N. pseudommatos, sp. n.

Hyaline; eyes yellowish brown, pronotum and scutellum tinged with stramineous. In the middle line of the vertex, close to the anterior margin, is a large round blackish brown spot, from which proceeds a thin median line of the same colour, terminating at the base ("apex" auctt.) of scutellum; along the lateral margins of the head (except apically) is a line of the same colour, continued (in the same straight line) on the pronotum. Tegmina hyaline, sparingly punctured, the punctures scantily piliferous; membrane pale salmon-coloured, a large round submedian spot and the apical margin blackish brown; three faint fasciæ on the corium of the same colour. Ventral surface whitish; apex of posterior tibiæ and first segment of posterior tarsi blackish.

Length 4½ mill. Pundaluoya (July, 1898, E. E. Green).

I have only one specimen, unfortunately, of this pretty but fragile little Tetigoniid, and have therefore not risked a detailed examination of the genitalia, &c., hoping to receive later a series. A coloured representation (as also of the other new species) will appear in another place; in the meantime the characteristic form—not unlike that of *Hecalus*, Stål—the feebly developed "nervural" system and the remarkable colouring, hyaline and colourless with a membranal black spot encircled by pale salmon, will at once distinguish it from any of its allies.

TETIGONIA ALBIDA (Walker).

Peradeniya, January, 1900 (E. E. Green). Reg. No. 102. "Makes itself a great nuisance, swarming round lamps in the rooms at night" (E. E. Green *in litt.* 5 (iii.), 1900.

This pretty little species, which has been kindly identified by my friend Dr. Melichar, is widely distributed, having been recorded previously from North Australia, the Philippines, "British India," Madagascar, Senegambia, Kaffraria, and Cape of Good Hope. It is figured by Signoret, 1853, Ann. Soc. Ent. France (3) i. pl. 21, f. 3.

TETIGONIA KALIDASA, sp. n.

Belongs to subgenus *Diedrocephala*, Spinola. Head subacutely triangular, vertex slightly concave, basal half very narrowly sulcate. Pale green, an angularly arched fascia on the vertex, two concentric roundly arched fasciæ on the pronotum, each of which is continued on to the clavus, meeting the claval suture; two fairly straight fasciæ on the corium (sometimes a little irregular), bright scarlet (in one specimen orange-yellow). Membrane sometimes infuscate. Ventral surface pale yellowish green. Length $4\frac{3}{4}$–$5\frac{1}{4}$ mill. Pundaluoya (April, 1898, E. E. Green).

This handsome little scarlet-and-green species is interesting as belonging to the subgenus *Diedrocephala*, which is mainly (if not even entirely) American.

THOMSONIELLA KIRSCHBAUMII (Stål), Sign., was omitted by Kirby in his Catalogue. It is figured in Ann. Soc. Ent. France (5) 10, pl. 1, fig. 44 (1880).

†GYPONA STRIATA, Kirby, 1891, J. L. S. xxiv. p. 171, and †G. PRASINA, Walker, 1858, List. Hom. Suppl. p. 258, do not conform to the genus *Gypona*, Germ., as restricted by recent authors. They are closely allied to *Titia*, Stål, but will probably require a new genus. Both specific names are preoccupied by Burmeister (Genera Insect. pl. 16), and as, according to the now generally accepted rule, "once a synonym, always a synonym," they are now invalid for any genus, I propose KIRBYI and WALKERI, nom. nov., respectively. As Kirby surmises, (*l. c.* p. 171), fresh examples of *Kirbyi* (*striata*) are grass-green in colour.

Fam. FULGORIDÆ.

†EURYBRACHYS WESTWOODII, Kirby, *l. c.* 146, is a MESSENA, Stål.

MELICHARIA, gen. nov.

Belongs to subfamily Poekillopterinæ [=Flatidæ + Ricaniidæ auctt.], and is very closely allied to *Flata*, Fabr. and

Ormenis, Stål.* The general characters are those of *Flata*, but the single series of nervures dividing the membrane from the corium is much more regular, and there is no reticulation at the apex of the latter. There are also no transverse nervures in the clavus.

Type M. SINHALANA, nom. nov.—This is the †*Poeciloptera quadrata*, Kirby, *l. c.* p. 154, pl. vi. f. 8, but not that of Walker from Jamaica (1850, List. Hom.), and, therefore, in accordance with the rule mentioned above, the name is now changed.

SCARPANTA TENNENTINA (Walker) = *Scarpanta latipennis*, Kirby, *l. c.* p. 153. The unique specimen of *latipennis* appears to be founded upon a poor example of *tennentina*.

RICANIA FENESTRATA (Fabr.); Peradeniya, frequenting *Aristolochia*, sp. (E. E. Green).

Family GEOCORIDÆ [= Lygæidæ auctt.].

In employing remedial measures against insect pests, entomologists have often to guard against the destruction at the same time of certain natural enemies of these pests, owing to the general similarity in appearance, both in external structure and in colour, of the insectivores and their prey. Mr. Green has recently sent me two nymphs, one of *Antilochus coquebertii* (Fabr.), the other of *Dysdercus cingulatus* (Fabr.)—the dreaded "Oriental Cotton-stainer"—with the note that the former had been discovered with its rostrum inserted in the person of the latter; as these two species belong to the same subfamily, Pyrrhocorinæ [= Largidæ + Pyrrhocoridæ auctt.], all the members of which are reputed to be vegetable feeders, I wrote Mr. Green, querying the note; but, in a reply dated Sept. 13th, 1900, he observes: "I think *Antilochus coquebertii* normally preys upon *Dysdercus cingulatus*; I have repeatedly seen the performance. If the two individuals are put in a glass tube together, the *Antilochus* immediately pounces upon the *Dysdercus*." As the two insects are, comparatively, very similar in appearance, the former being merely larger and more brightly coloured in all stages, this observation appears to be of distinct value in connection with the cotton-plant question.

Fam. CIMICIDÆ.

CANTHECONA COGNATA, Dist.

C. furcellata, Wolff, has been noted (Indian Museum Notes, ii. 165, and iii. (5) 56) as a destroyer of caterpillars; Mr. Green has now sent me specimens (imago and nymph) of *C. cognata*, Dist. [= *insularis*, Kirby] that were "doing really good service in preying upon a caterpillar that was ravaging some croton plants here" (Peradeniya, Reg. No. 302).

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* A detailed description, with figures of neuration, &c., was in progress when I learned that Dr. Melichar has in preparation a monographic revision of the group: I have therefore given here only a brief diagnosis.

RHYNCHOTA MISCELLANEA.

By G. W. Kirkaldy, F.E.S.

Fam. Tetigoniidæ.

Tetigonia ferruginea (Fabr.).—Chosen (Korea), Port Lazareff (T. B. Fletcher, R.N.). This fine species is very common throughout the Oriental Region from China to Tenasserim, and would indeed be included in the palæarctic fauna at Port Lazareff.

Fam. Fulgoridæ.

Geisha, gen. nov.

Subf. Poekillopterinæ; the characters are those of *Flata*, but there are no transverse nervures in the clavus, while the transverse nervures on the corium are very irregular, so that there is no sutured-off membrane. The latter character will at once separate it from *Melicharia*, Kirk.

Type *Pœciloptera distinctissima*, Walker, 1858. List. Hom. Suppl. p. 114 (China and Japan).

Poekilloptera, *Latr.*

Fowler, who adopts the later spelling "*Poeciloptera*," enumerates in the 'Biologia Centrali-Americana, Homoptera, I.,' p. 50, some of the variations of the name; but, as one of the references is inaccurate, and others are not the earliest known, a corrected list is here appended:—

Poekilloptera, Latreille, 1796, Précis, ex pp. 83–92; and 1804, Nouv. Dict. Nat. Hist. xxiv., Tabl. méth., ex pp. 163–8.

Poeciloptera, Latreille, 1804, Hist. Nat. Crust. Ins. xii. 315.

Fulgora, subg. *Flata*,* Latreille, 1807, Gen. Crust. Ins. iii. 164–5.

Poecilloptera, 1818, Germar, Mag. Ent. iii. 218; 1825, Lep. Serv. Enc. Méth. x. 168.

Paeciloptere, Latreille, 1825, Fam. Nat. 427.

Cenestra circulata (Guérin), St. Thomas (Pavenstedt, Mus. Bremen).

Phromnia flaccida (Walker), Nias Island (Mus. Bremen).

Cerynia deplana (Walker) = *albata*, Stål), Sumatra (coll. Kirkaldy, ex coll. Seeldrayers).

Pyrops [auctt.] *tenebrosus* (Fabr.), Belgian Kongo (collns. Seeldrayers and Kirkaldy); Hinterland of Togo (Spiess, Mus. Bremen).

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* Fowler incorrectly quotes this reference as "*Poekilloptera*." That name was appended in brackets as a synonym of *Flata*, Fabr., subg. of *Fulgora*, Linn.

Fam. Cercopidæ.

Ptyelus flavescens (Fabr.); Belgian Kongo (collns. Seeldrayers and Kirkaldy).

P. grossus (Fabr.) var. *eburneus;* Belgian Kongo (collns. Seeldrayers and Kirkaldy).

Fam. Cicadidæ.

Dundubia mannifera (Linn.); Sumatra, Deli, Soekaranda Estate (v. Usler, Mus. Bremen).

D. minahassæ (Dist.); Celebes, Maros (Albrandt, Mus. Bremen).

Pycna limbata (Fabr.); Togo (Spiess, Mus. Bremen).

Fam. Reduviidæ.

Platymeris horrida, Stål; Belgian Kongo, Luvituka (collns. Seeldrayers and Kirkaldy).

BRITISH DRAGONFLIES OF THE OLDER ENGLISH AUTHORS.

By W. J. Lucas, B.A., F.E.S.

(Continued from p. 260.)

7. *W. F. Evans: 'British Libellulinæ,'* 1845.

Under this title we have a small book containing twenty-one plates, in which are figured fifty-two dragonflies, a brief notice of each being given in twenty-eight pages of letterpress. The author believes "that one good figure of an insect is better than the most elaborate description by itself." Acting on this belief, he states that he has drawn the plates with the greatest care from the insects themselves. In this, however, he has achieved but a very moderate degree of success, for the drawing of the figures is extremely poor, and the colouring worse. It is, in fact, with the greatest difficulty that several of the insects can be recognized at all, and the identification therefore of some of the figures is given with considerable diffidence. The first two plates are devoted to details and nymphs.

Agrion rubellum (pl. 3, fig. 1 ♂) = *Pyrrhosoma tenellum* ♂.
A. xanthopterum (pl. 3, f. 2) = *P. tenellum* also, apparently; but McLachlan and Kirby take it to be *Ischnura pumilio.*
A. elegans (pl. 3, f. 3 ♂, 4 ♀) = *Ischnura elegans* ♂ ♀.
A. azonatum (pl. 3, f. 5) = *I. elegans* (♀ ?).
A. rubens (pl. 3, f. 6) = orange variety of ♀ of *I. elegans*, probably.
A. puella (pl. 3, f. 7 ♂, 8 ♀) = *Agrion pulchellum* ♂ ♀.
A. furcatum (pl. 4, f. 1 ♂, 2 ♀) = *A. puella* ♂ ♂.
A. lunulatum (pl. 4. f. 3 ♂, 4 ♀) = *A. pulchellum* ♂ ♀.
A. hastulatum (pl. 4, f. 5 ♂, 6 ♀) = ? This is one of those that it

is impossible to identify satisfactorily; Messrs. McLachlan and Kirby set it down as *A. pulchellum.*

A. cyathigerum (pl. 4, f. 7 ♂) = *A. pulchellum* ♀.

A. brunnea (pl. 4, f. 8) = *Enallagma cyathigerum* ♀.

A. annulare (pl. 5, f. 1 ♀) = *A. puella* ♂.

A. rufescens (pl. 5, f. 2 ♂) = according to Kirby, *Ischnura elegans*, and possibly it may be the variety of this species with orange thorax.

Pyrrhosoma minium (pl. 5, f. 3 ♂, 4 ♀) = *P. nymphula* ♂ ♀.

Erythromma fulvipes (pl. 5, f. 5 ♀) = *P. nymphula*, ♂ with colouring somewhat immature.

E. chloridion (pl. 5, f. 6 ♀) = *P. nymphula* ♀ with colouring immature. The tip of the abdomen of a male, given with it, apparently belongs to *Erythromma naias.*

Ischnura pumilio (pl. 5, f. 7 ♂) may possibly be intended for *I. pumilio*, but the figure is most indefinite.

Platycnemis platypoda (pl. 6, f. 1 ♂, 2 ♀) = *Platycnemis pennipes* ♂ ♂.

Lestes viridis (pl. 6, f. 3 ♂) = *L. sponsa* ♂ [*L. nympha* (unfigured) Evans considers to be a dark var. of this species].

L. forcipula (pl. 6, f. 4 ♂) = probably *L. sponsa* ♂.

Calepteryx virgo (pl. 7, f. 1 ♂, 2 ♀) = *Calopteryx splendens* ♂ ♀.

C. Ludoviciana (pl. 7, f. 3 ♂; pl. 8, f. 1 ♀) = *C. virgo* ♂; ditto ♀ with very dark wings [I judge that it is ♀ by the white pterostigma.]

C. hœmorrhoidalis (pl. 8, f. 2 ♂, 3 ♀) = *C. virgo* ♂ ♀.

C. anceps (pl. 9, f. 1 ♂) = *C. virgo*, var. *anceps*—the var. in which the blue pigment is wanting from the wings.

Anax formosus (pl. 9, f. 2 ♀) = *Anax imperator* ♂.

Æshna rufescens (pl. 10, f. 1 ♂) = *Æschna isosceles* ♀.

Æ. grandis (pl. 10, f. 2 ♂) = *Æ. grandis* ♂.

Œ. maculatissima (pl. 11, f, 1 ♂) = *Æ. cyanea* ♂.

Œ. juncea (pl. 11, f. 2 ♂) = probably *Æ. juncea* ♂.

Œ. mixta ((pl. 12, f. 1 ♀) = probably *Æ. mixta* ♂.

Œ. affinis (pl. 12, f. 2 ♂) = probably *Æ. mixta* ♂.

Brachytron vernalis (pl. 13, f. 1 ♂) = *B. pratense* ♂.

Cordulegaster annulatus (pl. 13, f. 2 ♀) = *C. annulatus* ♀. The tip of abdomen of male is drawn at the side.

Gomphus vulgatissimus (pl. 14, f. 1 ♂) = *G. vulgatissimus* ♂.

G. flavipes (pl. 14, f. 2 ♂) = *G. flavipes* ♂.

Cordulia ænea (pl. 14, f. 3 ♂) = *C. ænea* ♂.

C. metallica (pl. 15, f. 1 ♂). By the build of the insect this may be *Somatochlora metallica*, but if so, the locality—round London—is at fault.

C. Curtisii (pl. 15, f. 2, ♂ 3 ♀) = *Oxygastra curtisii* ♂ ♀.

Libellula depressa (pl. 16, f. 1 ♂, 2 ♀) = *L. depressa* ♂ ♀.

L. conspurcata (pl. 16, f. 3, ♀) = *L. fulva* ♀.

L. 4-maculata (pl. 17, f. 1 ♂) = *L. quadrimaculata* (♂ probably) [*L. 2-maculata* (unfigured) is considered by Evans to be a var.].

L. prænubila (pl. 17, f. 2 ♂) = *L. quadrimaculata* var. *prænubila.*

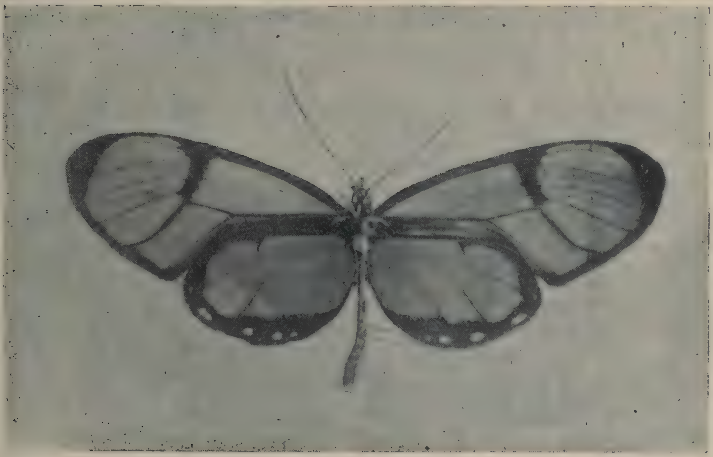
L. cancellata (pl. 17, f. 3 ♂, p. 18, f. 1 ♀) = *Orthetrum cancellatum* ♂, ♀.

L. cœrulescens (pl. 18, f. 2 ♂, 3 ♀) = *O. cærulescens* ♂ ♀.

Diplax scotica (pl. 19, f. 1 ♂, 2 ♀) = *Sympetrum scoticum* ♂ ♀.
D. rufostigma (pl. 19, f. 3 ♂, 4 ♀) = *S. sanguineum* ♂ ♀.
D. pallidistigma (pl. 20, f. 1) = *S. scoticum* (? ♂), immature.
D. angustipennis (pl. 20, f. 2) = *S. sanguineum*, probably.
D. vulgata (pl. 20, f. 3 ♂) = *S. striolatum* ♂, immature.
D. basalis (pl. 21, f. 1) = *S. sanguineum* ♂, immature.
D. flaveola (pl. 21, f. 2 ♂) = *S. flaveolum* ♂.
D. rubicunda (pl. 21, f. 3 ♂) = *Leucorrhinia dubia* ♂.

DESCRIPTION OF A NEW SPECIES OF *DIRCENNA* FROM PERU.

By Walter Dannatt, F.E.S.



Dircenna barrettii, sp. n.

Male. Anterior wings transparent golden, with margins very dark brown (almost black), wider at apex. A broad dark band at end of cell, which is continued in a lesser degree down the second median nervule to the margin. Posterior wings have wide irregular margins with a submarginal series of five irregular white spots. Under side as above, but apex of anterior wing has three elongated white spots. Expanse, $3\frac{5}{16}$ in.

Hab. Perene, Peru.

This remarkable species, though believed by Dr. Staudinger to be a *Dircenna*, differs in some respects from hitherto known species in this genus (see fig.).

I have great pleasure in naming this insect after an American friend, Mr. Otis W. Barrett, to whom I am indebted for the addition of many beautiful specimens to my collection.

Donnington, Blackheath.

DESCRIPTION OF THE EGG OF *POLYOMMATUS CORYDON.*

By F. W. Frohawk, M.B.O.U., F.E.S.

As I believe there is no published description of the egg of this common butterfly, the following is a description taken down in my note-book on Aug. 16th last, after figuring the specimen. I should state that I examined several ova to check the one described.

On Aug. 13th, 1900, I watched several females in the act of depositing, on various stems of the usual stunted herbage to be found growing on chalk downs. They frequently crawled among the plants for a distance of about a couple of feet, occasionally curving the abdomen downwards among the small plant-stems and grasses, and here and there deposited an egg. I therefore dug up portions of the turf, potted it, and placed a couple of females on each lot; they deposited ova on the 14th and 15th, on the stems of the various plants; a few were laid upon the brown dead trefoil leaves, as well as on the living leaves; but the site generally chosen is the intermingled stems of both plants and grasses. Another female, placed upon a similar pot of plants, deposited about fifty ova on Sept. 10th, nearly all being placed upon the stems, and a few upon the under side of the leaves of rock-rose; in all cases the eggs are deposited singly.

"The egg is $\frac{1}{48}$ in. in diameter and $\frac{1}{90}$ in. high; it differs in shape from all the other eggs of the 'blues' which I have examined; instead of having a concaved surface above, it is flat, with merely the micropyle sunken; it is also higher in proportion, and the sides are almost perpendicular; the base is flattened, the micropyle is very finely punctured, an irregular network pattern covers the upper surface and gradually increases in size to the outer rim, where it develops into a beautiful lace-like pattern, which is considerably bolder than that of the other 'blues'' eggs with which I am acquainted. The reticulations are united by very large prominent projecting knobs, and vary in number from five to seven. The sunken spaces between are very finely granulated. The colour when first laid is almost white, mainly caused by the whiteness of the glass-like reticulations and knobs, the colouring gradually changing to a slightly greenish grey hue."

As the egg does not hatch until the following spring, the reason for no particular plant being selected as a site for the egg is at once apparent, as necessarily all the plants die off in the winter and become an entangled mass of withered stems. The young larva, upon emerging in the spring, must then search for the fresh growth of its proper food-plant.

September, 1900.

NOTES AND OBSERVATIONS.

Orthoptera at Sugar.—Referring to Mr. W. J. Lucas's note (Entom. Oct. 1900, p. 266), I can add that during a collecting expedition to South Devon at the end of August and the early part of September last, Orthoptera were frequent visitors to my "sugar." No less than five species occurred, of which, next to *Forficula auricularia*, the most plentiful species was *Leptophyes punctatissima*, of which I saw as many as half a dozen or more on one evening; and very striking they appeared sipping the sweets among, and as greedily as, the Lepidoptera. Next in point of numbers came the fine *Locusta viridissima*, followed in smaller numbers by *Meconema varia* and *Ectobia panzeri*, of both of which there were at least several. The genus *Stenobothrus* was evidently not attracted, as, although *S. bicolor* abounded everywhere, I never saw one actually on the sugar. *Xiphidium dorsale* was not uncommon on marshy ground, and it probably would have been attracted if "sugar" had been used in its immediate vicinity, which it was not.—Geo. T. Porritt; Crosland Hall, near Huddersfield, Oct. 5th, 1900.

Variety of Forficula auricularia.—Mr. F. B. Jennings has shown me a variety of *F. auricularia* which he took from under bark on an old hawthorn at Box Hill on August 5th last. It is small and very dark, almost as dark as *A. annulipes*. In the type the body is chestnut, the elytra paler, and the legs yellow. This one is almost unicolorous, the tint being a very dark brown-black.—W. J. Lucas; Oct. 15th, 1900.

Flatoides, a Remarkable Instance of Protective Coloration. [Rhynchota.]—In 1895 Brongniart called attention to a series of *Flatoides dealbatus* in the Paris Museum, from Madagascar,* as a remarkable instance of protective coloration. Among the more recent additions to the exponents of mimicry and protective resemblance arranged by Mr. Waterhouse in the Central Hall of the British Museum (Natural History) are some specimens of the above-mentioned species *in situ*. The harmony of these Fulgorids with their environment—lichens and mosses on the bark of certain trees—is admirable, and specially noteworthy are the apparent differences in the sculpturing of the elytra of various individuals—some quite smooth, others very rough, almost tuberculated—differences really due (as Mr. Waterhouse pointed out to the writer) to an optical illusion. This interesting genus occurs in Madagascar, New Guinea, and probably the greater portion of the Oriental Region.—G. W. Kirkaldy.

Monograph of the Membracidæ.—Messrs. Lovell Reeve & Co. have in preparation a monograph of the *Membracidæ*, a remarkable group of Homopterous insects which have not received the attention their peculiar and diverse forms deserve. The author is Mr. George Bowdler Buckton, F.R.S., F.L.S., who will be glad to hear, through the publishers, from entomologists and others who have specimens which they have reason to believe are as yet unknown to science.

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* "Note sur les Homoptères du genre *Flatoides*, Guérin" (Bull. Mus. Paris, No. 3, pp. 1–4 [? sep.]).

Food-plants of Homoptera.—Mr. E. D. Ball has lately been so kind as to identify a number of Homoptera for me, and it seems worth while to record the plants on which they occurred where these are known:—

(1.) *Idiocerus alternatus*, Fitch. Las Cruces, N.M., March 14th, on osage-orange. (*Ckll.*)

(2.) *Eutettix pulchella*, Baker. Mesilla, N.M., Aug. 26th, on *Populus*. (*Ckll.*)

(3.) *Ceresa turbida*, Godg. Rio Ruidoso, White Mts., N.M., Aug. 6th, about 7000 ft., on brake-fern. (*Townsend.*)

(4.) *Centruchus perdita*, A. & S. Rio Ruidoso, N.M., July 18th, about 6500 ft., beaten from *Quercus gambeli*. (*Townsend.*)

(5.) *Acutalis dorsalis*, Fitch. La Cueva, Organ Mts., N.M., Aug. 30th, about 5300 ft., beaten from *Quercus*. (*Townsend.*) I found this species at Dripping Spring, Organ Mts., and it lived, not upon the oak itself, but upon the *Phoradendron* growing on the oak.

(6.) *Thamnotettix coquilletti*, V. D. Mesa, Arizona, Oct. 17th, on a large-leafed *Acer*. (*Ckll.*)

(7.) *Deltocephalus fuscinervosus*, V. D. Rio Bonito, N.M., Oct. 17th, on *Solidago*. (*Townsend.*)—T. D. A. Cockerell; E. Las Vegas, N.M., Sept. 1900.

Asphondylia mentzeliæ, n. sp.—At Raton, N.M., on Aug. 27th, I found that the ovaries of *Mentzelia multiflora* auctt. were considerably infested by a Cecidomyiid, which, breeding in them, caused the flowers to wither. The red-brown pupa-shells of the fly were seen sticking out of the sides of the flowers, and I had the good fortune, at about 6 p.m., to find a male fly which had just emerged from the pupa. It was a pretty insect, with the thorax and abdomen pale pink; abdomen with white hairs; legs whitish, tarsi more or less blackened; wings grey, hairy, second longitudinal vein reaching tip of wing, third longitudinal vein forked a little beyond its middle, fold in region of third longitudinal vein very distinct; antennal segments cylindrical, sessile, with sparse whorls of not very long hairs. Expanse about 7 millim. As usual in *Asphondylia*, the characters of the adult fly are not very distinctive, but the habitat in *Mentzelia* flowers will at once distinguish this insect from all others. There was a small lepidopterous larva also breeding in the ovaries of the *Mentzelia*, but it was not abundant.—T. D. A. Cockerell.

CAPTURES AND FIELD REPORTS.

Notes from Natal.—Referring to my notes (*ante*, p. 229), I wish to say that the pupæ I found turned out to be those of *Zonilia accentifera*, and not of *Nephele hesperus*, as stated; also that I bred, from larva found on August 22nd, a slightly crippled female specimen of *Basiana postica*. This insect has the power of making a sound like that produced by *Acherontia atropos*. I have had two evenings' sugaring during this month (August), but so far as moths were concerned it was a failure.—Geo. F. Leigh; Durban, Natal.

Papilio machaon in Surrey.—One seen near East Grinstead about August 20th.—F. W. F.

Paplio machaon in Worcestershire.—A fine specimen of this butterfly was seen by Dr. Charles, of Grindrod, on August 31st, settled upon a thistle in the Teme valley, on a marshy spot of ground.—W. Edwards; Malvern.

One seen on August 31st near Martley.—F. W. Frohawk.

Late Appearance of Euchloë cardamines.—While in North Cornwall, on July 10th last, I was surprised to see a male specimen of *E. cardamines* flying towards me down a lane, and just before it reached me it swerved to the left and disappeared over a high bank; it was then only about four yards distant. I had hoped to take it as a record specimen of late emergence. Previous to this the latest date that I have observed this species was on June 30th, 1885, when I obtained a female example near West Wickham, Kent. The earliest record I have is that of a male I captured on April 25th, 1880, at Norwood, Surrey; excepting the early and tropical summer of 1893, when I found *cardamines* out in numbers on April 22nd in Kent.—F. W. Frohawk; October, 1900.

Argynnis aglaia var. at Dover.—I received a very fine variety of this species from a Dover correspondent. It was taken by him on July 16th last, in the first hollow (Langdon Hole I think it is called) on the east cliff, and was posted to me, unset, soon after capture. It is a male, in very fine condition, and somewhat resembles the figure of *adippe* (Entom. xv. 49), but the black on the upper side is not quite so extended nor clearly defined, while on the under surface the fore wings have more black than said figure, but in the hind wings the silver spots are normal, except those along the outer edge, which are only faintly discernible.—E. Sabine; Erith.

[I have seen the specimen from which the figure (Entom. xv. 49) was made, and have no hesitation in saying that it is an aberration of *A. aglaia.* As the insect represented by figs. 2, 2a, Plate I., in the same volume, was stated in the remarks accompanying the plate to be an aberration of *A. aglaia*, and afterwards corrected to *A. adippe*, it would seem that some little confusion had occurred in the identification of these two aberrations. —R. S.].

Apatura iris in Northamptonshire.—Two specimens of *A. iris* have been captured in July within a few miles of Northampton.—W. Bostock: Springfield, Northampton.

Lycæna bellargus (adonis) in Hertfordshire.—There is no record that I can find of this butterfly having been taken in this county until now. I have frequently looked for it on the chalk downs at Aldbury (where *L. corydon* is abundant every year), as *Hippocrepis comosa*, its food-plant, grows there abundantly, and I thought it ought to be found there. This month (September) I have found it on these hills, and have taken about a dozen specimens.—Arthur Cottam; Eldercroft, Watford.

Lycæna argiolus.—This species has been even more abundant this year than it was last season, and I have taken and bred a very fine series, among them being a pale lavender-coloured male, three or four males exceptionally dark, another male having some of the colouring pigment absent on right fore wing, and a female (first brood) unusually suffused with black on all the four wings. All were captured in my garden, where it was quite a common thing to net fifty or more in an hour or so of the forenoon. —E. Sabine; Erith, October, 1900.

Vanessa antiopa in Hertfordshire.—A fine specimen captured near Hatfield about October 10th.—[F. W. F.]

Vanessa antiopa at Huntingdon.—A fine specimen taken at Huntingdon on August 19th.—[F. W. F.]

Vanessa antiopa in Kent.—I took a perfect specimen of this species in an orchard at Beckenham, Kent, on August 31st last, at sugar.—G. Herbert Thompson; Benhall Vicarage, Saxmundham, Suffolk, Sept. 24th, 1900.

Vanessa antiopa in Norfolk.—One taken at sugar by Mr. Woodhall, near Holt, on August 30th.—[F. W. F.]

Vanessa antiopa, &c., in Somersetshire.—Three *V. antiopa* have been seen in Bridgwater, but neither of them was captured. *V. atalanta* has been abundant and very fine. *V. cardui* has been more common than usual; also *V. io*, which had been scarce here of late years.—Henry Corder; Sunnyside, Bridgwater, October 9th, 1900.

Vanessa antiopa in Suffolk.—On September 4th a specimen of *V. antiopa* was captured by Lorimer Fison at Stutton Hall, Suffolk, in an outhouse, attracted by a bottle of syrup put there to catch wasps.—W. Gifford Nash; Bedford.

Vanessa antiopa in Surrey.—One captured in a garden at Beddington, Surrey, on August 31st.—F. W. F.

Vanessa polychloros in London.—On July 21st my son caught a very fine female *V. polychloros* with his cap, close to South Bermondsey railway station.—D. Chittenden; 98, Court Hill Road, Lewisham, October 10th, 1900.

Vanessa polychloros at Herne, Kent.—On August 13th we captured two specimens of *V. polychloros*, which were flying round an oak tree in company with *V. atalanta*. They were attracted by the sap exuding from a wound in the trunk. We went again on the 14th, and succeeded in taking a third, which had settled on the trunk of another tree, also feeding on the sap. Although we have been collecting for ten years, we have never captured this insect in Bucks.—G. Ernest Peachell; High Wycombe, Bucks, August 26th, 1900.

Vanessa io in Yorkshire.—On September 28th I caught a specimen of *V. io* near the house. According to best authorities it is over a dozen years since one was caught in this district.—Arthur Robertshaw; Ellenrayde Hall, Luddenden Foot, October, 1900.

Acherontia atropos in London.—It may be of interest to record the capture of a specimen of *A. atropos* this morning. It was taken while at rest on a street lamp a few yards from our place of business in the Strand. —Watkins & Doncaster; October 3rd, 1900.

Acherontia atropos in Worcestershire.—This species has been more than usually abundant this season in the Malvern district, nine coming to my share.—W. Edwards; Malvern.

Macroglossa stellatarum.—*M. stellatarum*, which was abundant last year, has only been represented by an occasional specimen. I saw one this morning hovering over flowers during a smart shower of rain.—WALDEGRAVE; The Priory, Chewton Mendip, Somerset, Sept. 24th.

DEILEPHILA LIVORNICA IN NORTH STAFFORDSHIRE.—The Rev. W. H. Heale took in his garden at Wolstanton Vicarage a male specimen of *D. livornica* in excellent condition, flying at pinks, on July 11th. This is its first recorded appearance in our district, and is a most welcome addition to our list.—THO. W. DALTRY; Madeley Vicarage, Staffordshire.

CHŒROCAMPA NERII IN KENT.—A fine female of this rare species was captured by Master Guy Wickham, in his father's dining-room at Willow Grove, Yalding, about 6.30 p.m., on Sept. 18th last. The window of the room was open, and there was a lamp burning on a sideboard at the far end; there were some plants of *Nicotiana affinis* in the garden outside. Unfortunately it was very much damaged, as the boy had only a very small "sea-side" net and no killing-bottle, so the moth took a deal of hunting before it was caught, and had to be killed like a butterfly, by severe pinches under the thorax.—(Capt.) S. G. REID; Yalding, Kent, October, 1900.

NOTE ON A PUPA OF GONOPTERA LIBATRIX.—Both Newman and the Rev. Seymour St. John give as the food-plants of *G. libatrix* sallow and white willow only. This autumn I found at Hayward's Heath a pupa in a curled-up leaf of the black poplar, and from this a specimen of *G. libatrix* emerged a few days ago.—T. GODDARD WILLIAMS; The Neuk, Danehill, Sussex, October 15th, 1900.

NOTODONTA DICTÆOIDES DOUBLE-BROODED.—On June 6th last I took a pair of *N. dictæoides* on the bough of a birch. The female I sleeved on birch. She deposited eggs from which fifty-two larvæ resulted. These pupated, the last on August 4th. On the 28th of the same month four insects had emerged; and on the following day two more were out; the others are still in pupæ. On August 8th I took another pair, from which I obtained forty larvæ; the last of these pupated on October 5th. The earliest date I have taken the insect was June 6th this year; the latest I have taken it was August 31st, 1894.—C. HAMLIN; Forest Cottage, Balcombe, Sussex, October 9th, 1900.

XANTHIA GILVAGO IN SURREY.—I took a nice specimen of *X. gilvago* at sugar on September 26th last. I have not heard of the species being taken in this county before, and should like to know if this is so.—L. M. SETH-SMITH; Alleyne, Caterham Valley, Surrey, Oct. 5th, 1900.

[There are several records of the occurrence of this species in Surrey, some of them as recent as the year 1898 (*vide* Entom. xxxi. pp. 267, 293).—ED.]

PLUSIA MONETA AT MERSTHAM.—On July 28th of this year I took a specimen of *P. moneta* flying over *Nicotiana affinis* at Merstham, Surrey.—F. W. J. JACKSON, 2, Vicarage Gate, Kensington, W., Sept. 27th, 1900.

DIANTHŒCIA CUCUBALI IN AUGUST.—I took an apparently freshly emerged specimen of *D. cucubali* at sugar on August 14th at Merstham.—F. W. J. JACKSON, 2, Vicarage Gate, Kensington, W.

NOCTUA CASTANEA IN THE NEW FOREST.—With reference to the note on this species (*ante*, p. 271), it may interest you to hear that I took a fine specimen of the typical red form of *N. castanea* at sugar in the New Forest in August, 1895.—E. A. COCKAYNE; 6, Tapton House Road, Sheffield, October 6th, 1900.

Leucania vitellina in Essex.—I have the pleasure to record that I took a specimen of *L. vitellina* here at sugar on September 25th. As this is not altogether an abundant species, it may be as well to note that on the tree it looked very like a wasted *Xanthia ferruginea*. A more careful inspection of pale *X. ferruginea* therefore might possibly result in more *L. vitellina*.—(Rev.) W. Claxton, Navestock Vicarage, Romford.

Catocala fraxini in Norfolk.—One example taken on the sand-hills near Blakeney at the end of August.—[F. W. F.]

Heliothis scutosa (*Schiff.*) in South Devon.—On September 4th, whilst collecting with me in a clover-field near Dartmouth, my son, F. Capel Hanbury, captured a specimen of this extremely rare species. It flew rapidly when disturbed, and then buzzed at the clover-heads like *Plusia gamma*. The specimen is a male, but in poor condition. Mr. Eustace R. Bankes, who was staying with us at the time, saw the specimen alive, and concurred in the determination.—Frederick J. Hanbury; Stainforth House, Upper Clapton, N.E., September 24th, 1900.

Cymatophora occularis at Chingford.—On May 27th I took a pupa of this species under a poplar tree in my garden. The perfect insect emerged on May 31st. I should add that a friend of mine has also taken this moth, once at sugar last year, and again this year at light, in this locality.—S. Graham; Chingford, Essex.

Ennomos alniaria at Bognor.—In the course of a walk with my brother-in-law, Mr. Graham Davis, he called my attention to a moth caught in a spider's web on a gas-lamp in this town. On being captured and examined, it proved to be *E. alniaria*. I find this species is recorded by Mr. Alfred Lloyd in his list of the Lepidoptera of Bognor. Mr. W. H. B. Fletcher also informs me that it is known to occur at Chichester, some six miles from here as the crow flies.—R. Meldola; Bognor, Sept. 23rd, 1900.

Leucania vitellina and Plusia festucæ at Bognor.—Since sending the record of the capture of *E. alniaria*, I am able to add that, at sugar on September 28th, I took two very good specimens of *Leucania vitellina*. At Pagham, about the middle of the month, I saw at sugar, but unfortunately lost, a fine specimen of *Plusia festucæ*. Neither of these species is recorded in the local list.—R. Meldola; Bognor, Sept. 30th.

Pieris daplidice, &c., at Bognor.—Mr. H. L. F. Guermonprez, the well-known naturalist resident here, informs me that in many respects the season has been remarkable. I saw on his setting-board a beautiful *Pieris daplidice*, taken by him near Felpham on September 3rd. *Colias hyale* has been fairly common, and also *C. edusa* and the larva of *A. atropos*. It is noteworthy also that many species appear this year to have been made double-brooded by the fine September succeeding the wet and cold August. I took a good specimen of *Agrotis exclamationis*, for example, on September 21st, an unusually late date for this species.—R. Meldola; Bognor, September 30th.

Epunda nigra in Kent: a Correction.—In your last issue (*ante*, p. 271) I recorded the capture of *E. nigra* here. I should like to correct that statement. It was a mistake; the insect I took I afterwards discovered to be a very dark form of *E. lutulenta*. *E. nigra* has never been taken here or near here, as far as I can gather.—A. J. Lawrance; 8, Cross Roads, Bromley Common, Kent, October 19th, 1900.

Melanippe tristata.—I should like to record the capture at Church Stretton, in this county, last month, of a goodly number of *M. tristata.* I found it on the Longwynd, at an elevation of at least a thousand feet above the sea, where alone it seemed to occur. I had previously taken it only in two North Derbyshire localities, both of which are also at high elevations. Is this the experience of others?—(Rev.) Chas. F. Thornewill; Calvershall Vicarage, Whitchurch, Salop.

Note on Xanthia ferruginea and X. gilvago.—I have been breeding this year, from larvæ found in this parish, the two closely allied species, *X. ferruginea* and *X. gilvago*, the larvæ of which are practically undistinguishable. My first imago of *X. ferruginea* emerged on August 18th, while *X. gilvago* did not begin to appear till September 5th. Is this the experience of others, or is it merely an accident?—(Rev.) C. F. Thornewill; Calvershall Vicarage, Whitchurch, Salop, September 12th.

Aleucis pictaria in Kent.—I have to record the capture of a specimen of *A. pictaria* on April 23th last near Ashford. It was flying after dark, and is the only example of the species that I have ever met with in the locality, although I have collected there for a number of years past.—D. Chittenden; 98, Court Hill Road, Lewisham, S.E.

Liparis chrysorrhœa Abundant at Hove.—I was pleased to find the above-named insect very abundant in this neighbourhood this year.—Alan W. Cardinall; 18, Cromwell Road, Hove, July 29th, 1900.

Abundance of Plusia gamma.—You published a note from me (*ante*, p. 129) to the effect that during the whole of last year I did not see a single specimen of *Plusia gamma* in Hayling Island. Although this is usually a very common species here, this year it is more abundant than I have ever known it. Hundreds are to be seen during the day-time flying from flower-head to flower-head in every clover field.—Albert May; Hayling Island, August 21st.

[*P. gamma* appears to have been generally abundant throughout the country this year.—Ed.]

Odonata in Kent.—I took a female specimen of *Æschna mixta* at Ramsgate on September 19th. *Sympetrum striolatum* was swarming at Ramsgate on the same day, at Sandwich on Sept. 21st, and at Folkestone on October 3rd.—C. W. Colthrup; 127, Barry Road, East Dulwich, S.E., October 12th, 1900.

Rhyparobia maderæ in London.—I found an example of this species in my desk at Covent Garden this morning.—Henry J. Dixon; 29, Sutherland Avenue, Maida Vale, September 25th, 1900.

Sirex gigas.—This sawfly seems to have taken up its quarters permanently in the neighbourhood. I have caught half-a-dozen specimens in Kendal and Windermere during the past three years, the most recent falling stunned by the blow of a straw hat in Stramongate, Kendal, on July 21st this year.—(Rev.) A. M. Moss; 12, Greenside, Kendal.

Collecting at Sidmouth.—A few days' collecting at Sidmouth, with Mr. B. R. Roberts, of Cornwall, during the latter half of June, were faily successful, although the weather was so cold and wet. *Leucophasia sinapis* was abundant in its usual haunts on the cliff, and was in good condition. We found beating during the day far the most productive work, and took the following moths:—*Anticlea rubidata* (very abundant and in grand condition), *Numeria pulveraria*, *Emmelesia affinitata*, *E. alchemillata*, *E. decolorata*, *Cidaria corylata*, *C. silaceata*, *Ligdia adustata*, *Melanippe rivata*, *M. galiata*, *M. ocellata*, *Coremia propugnata*, *C. unidentata*, *Corycia temerata*, *Ephyra trilinearia*, and *E. omnicronaria*. Trunk searching was very tiring work, only one *Stauropis fagi* represented some hours' search. In the lanes, *Chelonia villica* was by no means scarce, and *Thecla rubi* were very plentiful. Sugaring was a failure; only a few *Acronycta rumicis*, *Agrotis exclamationis*, and *Xylophasia monoglypha* came to the bait.—H. O. Wells; Hurstfield, The Avenue, Gipsy Hill, London, S.E., Aug. 24th.

Notes from Southend.—At a distance of seven miles from here—a pleasant run over a good road for the cyclist—the asters made a fine show during September, and larvæ of *Cucullia asteris* were fairly common. Larvæ of *Spilodes palealis* occurred frequently in umbels of the wild carrot. Surely this species has been observed elsewhere this season. With us it seems to have reappeared in considerable numbers, after an absence of several years. A worn *Spilodes sticticalis* occurred at aster bloom, Sept. 15th, and a fine *Aplecta occulta* (typical southern form) came to sugared *Eupatorium* Aug. 18th.—F. G. Whittle; 3, Marine Avenue, Southend, Oct. 3rd.

Notes from North Wales.—While spending a fortnight's holiday at Barmouth, from the beginning of July, I had the pleasure of seeing *C. edusa* on two occasions: one specimen on the coast-road to Towyn, and another near Beddgelert. *Ino statices* was captured at an elevation of 1200 feet on one of the lower slopes of Cader Idris.—W. S. Gilles; Bocking, Braintree.

Catocala fraxini in the Isle of Wight.—On Sept. 19th last I had the good luck to capture a very fine specimen of this splendid moth at sugar on the trunk of an ash not far from this house, and another rather worn was taken close by three days later.—Hugo Harpur Crewe; Spring Hill, East Cowes, I. W.

Epunda nigra, Dasycampa rubiginea, &c., at Camberley.—On Sept. 20th last I took *E. nigra* on the trunk of an apple-tree that I had sugared; on Oct. 10th, 1899, I obtained a specimen of the same species on ivy. In October, 1899, I took two specimens of *D. rubiginea*, and last week (Oct. 16th, 17th, and 19th) I took three more specimens, all on the same piece of ivy. I also took *Xanthia aurago* at sugar in September last. All the above were taken within a radius of ten yards, on the borders of Berkshire, less than a mile from both Hants and Surrey.—(Lieut.-Col.) A. F. Mockler-Ferryman; R. M. College, Camberley, Oct. 23rd, 1900.

Miscellaneous Notes.—On July 13th last I took a day on the hills from Betchworth to Box Hill; one *E. hyperanthes*, quite fresh, was taken: *Hesperia thaumas* was out in tolerable numbers; *E. ianira* in intolerable ditto; *Euchelia jacobææ* was to be found both in the larval and in the perfect stage; in a clearing in a wood near Box Hill I took a specimen of *Thecla w-album* and saw one or two more; *Macroglossa stellatarum* was fairly abundant. On July 15th I again went to Box Hill; a very fine specimen of *Vanessa cardui* provided some sport, but was not captured, and I took two more *T. w-album;* this time *M. stellatarum* was in great numbers. Nailed shoes are advisable for the Box Hill country. Stimulated by Mr. Lucas's note (*ante*, p. 202) on the abundance of larvæ of *T. w-album* somewhere near Ripley, I went over there yesterday, hoping to complete my series more easily than would be the case at Box Hill; in this I was disappointed, as I did not see a single specimen. On the road from Ripley to Cobham I saw one of the large fritillaries, *A. paphia*, I think, but I could not say for certain. *Lycæna ægon* was abundant on the common on the east side of the road, and *Hesperia sylvanus* and *H. thaumas* were not uncommon. A female *Fidonia piniaria* was also taken. To-day I have seen a female *Lycæna argiolus* here (Sutton). Evidently the fine weather is bringing on second broods.—D. P. TURNER; Sutton, Surrey, July 18th, 1900.

COLIAS EDUSA AND C. HYALE IN ENGLAND, 1900.

(Continued from p. 280.)

COLIAS EDUSA AND C. HYALE IN CAMBRIDGESHIRE.—I saw two *C. hyale* and one *C. edusa*, flying in company, at Wisbech St. Mary, on Sept. 20th. I had no net with me, and when I visited the spot on the two succeeding days the wind was both cold and stiff, and *Colias* did not reappear. In "the great *edusa* year," in the seventies, they swarmed in that locality.—CHAS. OLDHAM; Chelmsford Road, South Woodford, N.E., Oct. 13th, 1900.

On Aug. 15th I took a specimen of *C. hyale* on the road between Soham and Wicken Fen.—W. GIFFORD NASH; Bedford.

COLIAS EDUSA AND VAR. HELICE IN CORNWALL.—Between Aug. 29th and Sept. 6th *C. edusa* was in great profusion near Falmouth. I first found them on Aug. 29th, on the clover in a stubble-field sloping sheer up from the sea-cliffs with an eastern aspect. I saw about twenty males, of which I captured six, but saw only one female. The next day was almost a repetition, except that I did not attempt any captures. The following day not a single *edusa* was to be seen in the field, although conditions of weather were just similar, and for a week after this I went daily to the field, but saw only a single female, which circumstance seems very unaccountable. However, on Aug. 31st I made tracks along the coast for about a couple of miles, and happened on a lucerne field where *edusa* simply swarmed. On this day females were much more abundant than males, but between Aug. 31st and Sept. 8th I found them about evenly distributed. This field was sloping sheer up from the sea-cliffs, and with both south and south-east aspects. My experience was almost a repetition of that recorded by Mr. Clogg in the second volume of the 'Entomologist,' page 338, and mentioned by Newman in his 'British Butterflies,' for between Aug. 31st and Sept. 8th I could have taken in this single field seven or eight hundred *edusa* without any difficulty. I daily took them freshly emerged from the chrysalis, and although I saw many before their wings were thoroughly dried, I was not fortunate enough to find a single pupa-case. Let it not be thought, however, that I am an "exterminator." I captured on an average about forty per day for the eight days (on the look out for vars., of course), but out of this number set only twenty-four males and twenty-four females (which a brother and a friend will share), releasing all the others. With delight I also record that from among the hundreds of *edusa* I saw, I captured eleven specimens of the beautiful female variety *helice*, all in grand condition, and of varying shades of colour, from the extremest variety. There are four distinct transitional shades of colour amongst them. With the exception of one morning, when I took four, a single *helice* only was taken each day, and these freshly emerged ones. From careful observations, *edusa* and *helice* were "at home" between the hours of 11 a.m. and 3 p.m.; either before or after, very few indeed were on the wing. I did not see a single *C. hyale.* In this same field *Plusia gamma* swarmed also; *Vanessa cardui* was fairly abundant, but a few only *V. atalanta* were seen.

The weather was beautiful all the time, with brilliant sunshine and light south and south-east winds. The memory of that field will ever give me delight, and, personally, I shall record the year as a *Colias* one. In and around Truro *C. edusa* has also been plentiful.—W A. ROLLASON; The White House, Truro, Cornwall, Oct. 6th, 1900.

COLIAS EDUSA AND C. HYALE IN HAMPSHIRE. — With regard to the occurrence of *C. edusa* and *C. hyale* this year, I may mention that on Portsdown Hill the latter, during last July and August, has been as abundant as the former. On August 14th I captured two insects together, and, strange to say, they were both identified as *helice.* I have heard of a typical male and var. *helice* being captured together, but never two *helice.* The only difference between these two specimens is that one possesses a faint yellow tint, which is entirely absent in the other. Also the border of the hind wing in the whitish specimen is not so well defined as in the yellowish one. Indeed the border of the latter is darker and broader than any *helice* that I have seen. In my opinion the dark specimen is the male, and the pale the female. In *hyale* I find two distinct colours—a canary-yellow and pale greenish white,— but they do not appear to be different sexes, as I have frequently taken two yellow together.—H. LA CHARD; 51, Powerscourt Road, Kingston, Portsmouth, Sept. 22nd, 1900.

Both *C. edusa* and *C. hyale* have been plentiful this year on the downs and railway embankments in the neighbourhood of Portsmouth. The two species occurred in about equal numbers. Between August 11th and Sept. 12th twenty-seven *C. hyale* were taken, of which eight were females. Others were captured and released after examination for var. *helice*, one of which was obtained. The latest date on which a specimen of *C. hyale* was seen was Sept. 24th; several specimens of *C. edusa*, however, were seen to be still flying on Oct. 12th. Single specimens of *C. edusa* were seen in different localities on June 12th, 13th, and 19th. The one seen on June 19th was a large, but rather worn female. It was full of eggs, and would evidently be the parent of an autumn brood.—G. M. RUSSELL; Oct. 15th.

COLIAS HYALE IN KENT.—In my recent note (*ante*, p. 277) on the occurrence of *C. edusa* and *C. hyale* at Hythe, I mentioned the capture of a specimen of *C. edusa* var. *helice.* The insect in question is a white form of *C. hyale.*—R. S. MITFORD; 35, Redcliffe Square, S.W., Oct. 7th, 1900.

COLIAS EDUSA IN LANCASHIRE.—I caught a very fine male *C. edusa*, a rather large one, at Grange-over-Sands, in North Lancashire, during the second week in September. It was flying over a field of ragwort, close to the sea-shore. I watched the field for many days after, but never got another, although others were seen before my capture, by other collectors. I am not aware that any specimens of *C. hyale* were seen.—R. C. LOWTHER; Fernleigh, Grange-over-Sands, North Lancashire, Oct. 14th.

COLIAS EDUSA AND C. HYALE IN LEICESTERSHIRE.—During the last week in August I saw several specimens of *C. edusa* and one of *C. hyale*, in the Charnwood Forest, near Loughborough. — W. GIFFORD NASH; Bedford.

COLIAS EDUSA IN LONDON.—A specimen of *C. edusa* was noticed in the Strand, making its way towards Charing Cross, about a fortnight ago.— WATKINS & DONCASTER, 36, Strand, W.C., Oct. 3rd, 1900.

COLIAS EDUSA AND C. HYALE, &c., IN NORFOLK.—On Aug. 13th I captured, at Honing, near North Walsham, a male and female of *C. hyale*, and a female of *C. edusa*, in a clover-field; all were fine specimens. *Cynthia* *cardui* was abundant, and *Vanessa io* swarming, in the same field. I also took two fine specimens of *Catocala nupta*, on tarred wood, in the same place.—F. A. OLDAKER; Parsonage House, Dorking, Oct. 11th, 1900.

COLIAS EDUSA AND C. HYALE IN NORTHAMPTONSHIRE.—*C. edusa* has been fairly abundant in many localities in Northamptonshire, and *C. hyale* has been seen and captured frequently. My sons caught five of the latter, and altogether I have heard of some twenty more captures near Northampton. The appearance here of *C. hyale* is most unusual, and I have not seen it before over a period of twenty-five years.—W. BOSTOCK; Springfield, Northampton, Oct. 9th, 1900.

COLIAS EDUSA IN NORTH WALES —During a five weeks' sojourn in Wales, over an extensive tract of country, I was much struck by the comparative rarity of *C. edusa*, in what has evidently been "an *edusa* year." Starting at Aberystwyth on Aug. 9th, I went out in daily expectation of seeing *edusa*, especially as the weather was all that could be desired for entomology. No sign of it appeared, however, until Aug. 23rd, when a fine female was given to me on Constitution Hill, caught within a few yards of the turnstile at the top of the cliff tramway; and on the following day a second specimen was noticed, flying on the railway embankment between Aberystwyth and Clarach. On Sept. 3rd we left Aberystwyth for Barmouth, and though we explored the country in all directions, *edusa* was still scarce. On the 6th, 9th, and 10th, odd specimens were seen in Barmouth, probably the same insect, as all occurred within a few yards of each other and near the sea-shore, the last being seen on the station siding. On the 5th a single specimen was noticed, flying in some fields between Llanbedr and Harlech; and on the 7th another was observed, near the head of Tal-y-Llyn, close to the foot of Cader Idris. On Sept. 10th we moved into Snowdonia, and on the 11th saw three *edusa* within a few miles of Beddgelert. Another single specimen on the 14th, near the Fairy Glen, Bettws-y-Coed, completes the list—a very disappointing one for the large area comprised.—E. MAUDE ALDERSON.

C. edusa was abundant this year at a small place about two miles from Holyhead, in Anglesea. First seen on Aug. 26th, and in numbers during first week of September; I have seen as many as seven in flight at once; my daughter caught no less than eleven in about an hour and a half. I was unfortunately, lame, and could not join in the pursuit. We caught twenty-three, all, except one that was worn, fine fresh specimens; there were twenty males and three females. I also ascertained that some neighbours captured sixteen males and two females. I left on Sept. 10th, and do not know what was done after, No *hyale* seen.—T. ROMER; The Lings, Livingstone Drive, S., Liverpool, Sept. 22nd, 1900.

COLIAS EDUSA IN SOUTH PEMBROKESHIRE.—This butterfly has been quite common here this summer, chiefly males; but though a careful watch has been kept, we have not seen a single specimen of *helice*, nor of *C. hyale*, which I believe never comes so far west. There have been immense numbers of the common *E. tithonus*, both here and at St. Davids, but sugar and ivy have both been very unproductive this year.—J. S. PUCKRIDGE; Castlemartin Vicarage, Pembroke.

COLIAS EDUSA AND C. HYALE IN SOMERSETSHIRE.—I did not come here till Aug. 8th. I saw my first *C. edusa* on the 13th, and have observed stray specimens on most fine days since the 18th of that month, which, with very few exceptions, were males. The land here being nearly all grass, there is not much attraction in the way of clover-fields.—WALDEGRAVE; The Priory, Chewton Mendip, Sept. 24th, 1900.

You may perhaps have had reports as to *Colias* from this district. In August I saw, near Bridgwater, one specimen of *C. hyale* and a few *C. edusa*. Mr. Cottam, of Watford, took one *hyale*, three *helice*, and other *edusa*. I then went to Chelmsford, where *edusa* were decidedly scarce, only four or five being seen in a fortnight, but I took a nice series of *hyale*, in good condition, at the end of August. Returning to Bridgwater, could hear of no more *hyale*, but *edusa* was still to be found in clover-fields; females were rare, and no more *helice*.—H. CORDER; Sunnyside, Bridgwater, Oct. 9th.

COLIAS EDUSA, &c., IN STAFFORDSHIRE. — *C. edusa* has at length reappeared in North Staffordshire; on Aug. 27th my friend, Mr. W. H. Earl, of Newcastle-under-Lyme, saw one between Endon and Leek, and on Sept. 4th my son Harold found one asleep on a flower, in a cutting of the North Staffordshire Railway in this parish; it is a very fine female specimen, in perfect condition; two days later he saw two others in Swynnerton Old Park, My son also captured a fine male *Vanessa cardui*, flying at petunias close to my front door. This is an insect which has not been observed here for several years; I have never known it to be plentiful in North Staffordshire. Since his return to school I saw a male *Gonepteryx rhamni*, flying at flowers in the vicarage garden, on Sept. 23rd and 25th. This species is very uncommon here; I have only seen three or four specimens during the forty years I have been here, and I never saw it in the garden before. *V. atalanta* has been most abundant here all September; it chiefly affects the dahlia flowers, and I frequently observed from a dozen to twenty at one time on ours. A few *V. io* were also observed.—(Rev.) T. W. DALTRY; Madeley Vicarage, Staffs.

COLIAS EDUSA AND C. HYALE IN SUFFOLK.—On Aug. 13th the first specimens made their appearance in a clover-field at Stutton Hall, and during the month eighteen specimens of *C. hyale*, several *C. edusa*, and six specimens of the variety *helice* were taken.—W. GIFFORD NASH; Bedford.

COLIAS EDUSA AND C. HYALE IN SURREY.—The above have been very plentiful this year in Reigate district; eleven *C. hyale* and thirteen *C. edusa* have fallen to my net alone. I saw over three dozen of *C. hyale* on Aug. 27th.—W. FAIRCHILD; 5, Worcester Road. Reigate, Surrey, Sept. 30th.

COLIAS EDUSA IN SUSSEX.—Although not seen in sufficient numbers to be called abundant, *C. edusa* may fairly be said to have been tolerably common at Eastbourne in the later part of August and the first week in September last, I first met with it in one of the sheltered hollows under Beachy Head, on Aug. 24th, when a somewhat wasted female was taken. On the following day another example flew past me, too rapidly to admit of either condition or sex being ascertained, as I was on my way to the same spot, and on reaching there I secured a still more wasted female than the first, which, it is needless to say, I also turned adrift. I had no further opportunity of looking for the species until Sept. 3rd, when, on going to the same "hollow," I found *edusa* flying wildly on the down-sides, whether one or half a dozen I am unable to say, but I can honestly say that, in my endeavour to elucidate the question, I took more physical exertion in the course of an hour than I had done in a like space of time for many a long day. However, on the following morning the question was set at rest by the capture of some half-dozen individuals, comprising both sexes, and for the most part in fairly fresh order, and several others being seen. Beyond this, some three examples, all males, were from time to time seen flying along the beach or parade, but I met with none in the surrounding country, although I traversed a good deal of it; nor did any *C. hyale* come under my notice.—ROBERT ADKIN; Lewisham, October, 1900.

COLIAS EDUSA AND C. HYALE IN WORCESTERSHIRE.—I have seen both species in various parts of this neighbourhood.—W. EDWARDS; Malvern.

COLIAS EDUSA IN YORKSHIRE.—A fine specimen of *C. edusa* was seen on the New Esplanade, Scarborough, on Sept. 25th.—JAMES H. ROWNTREE.

COLIAS HYALE IN MAY AND JUNE, 1900.—It is a regrettable fact that no notices of the earlier appearances of *C. hyale* have been published in the 'Entomologist.' I observe in the October number of the Magazine that only in one instance has the appearance been noted, that by Mr. Colthrup, at Beachy Head on June 12th. *C. hyale* was observed in some numbers during the earlier (and finer) days of June at Darenth, in Kent. Mr. Davis, of Dartford, reported its appearance in the last week of May. No fewer than a dozen were taken in the vicinity of Farningham during June. I myself observed the insect at Shoreham, Otford, Old Bexley, Uplands (Bexley Heath), and Crayford; and Mr. T. B, Andrews, of Bexley Heath, captured two fine specimens at Bridgen, on June 10th or 11th. Several were also observed on Plumstead marshes in late May. *C. hyale* has been particularly plentiful this season in this district, more so in fact than *C. edusa*, which may account for the fact that so few var. *helice* have been taken. Given a mild winter, I would venture to prophesy that 1901 will prove the "*edusa* year."—WM. A. CARTER; Burr Villas, Bexley Heath, Oct. 20th, 1900.

COLIAS HYALE IN JUNE.—Mr. H. S. Fremlin informs me that he saw a specimen of *C. hyale* at Mereworth, in Kent, in June last. He thinks the date was the 4th of the month.—RICHARD SOUTH.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*October 3rd*, 1900.—Mr. G. H. Verrall, President, in the chair. Mr. E. A. C. Studd, Oxton, Exeter Mr. H. Maxwell Lefroy, B.A., Barbadoes Economic Entomologist to the Imperial Agricultural Department for the West Indies; Mr. W. F. Urwick, 34, Great Tower Street, London, E.C., were elected Fellows of the Society.—Mr. G. C. Champion exhibited specimens of *Trogophlœus anglicanus*, Sharp, found by Mr. Keys at Plymouth; *Pachyta sexmaculata*, L., found by Col. Yerbury at Nethy Bridge, and *Anchomenus quadripunctatus*, De Geer, found by himself at Woking.—Mr. M. Jacoby exhibited an ichneumon, *Rhyssa persuasoria*, taken by him at Blandford, parasitic on *Sirex*, and Col. Yerbery said that he had met with the same species in some numbers in Scotland. One female observed in the act of oviposition had thrust her ovipositor, which is about the consistency of a human hair, through an inch of fir trunk.—Col. Yerbery exhibited:—(1) a rare sawfly, *Xyphidria camelus*, taken in Scotland this year at Nethy Bridge. The species is mentioned in the old books as extinct in the United Kingdom, and Mr. Waterhouse said there were no modern specimens in the South Kensington

Museum collection. (2) Rare diptera from Scotland, including (a) *Laphria flava*, two males from Nethy Bridge; (b) *Chamæsyrphus scævoides*, new to the fauna of Great Britain, from the Mound, Sutherland, where it was common on Umbelliferæ under fir trees in a damp wood, one female also being taken on the path up Cairngorm, near Glenmore Lodge; (c) *Microdon devius;* (d) *Chilosia chrysocoma* at mountain-ash blossom, Nethy Bridge; and (e) *Stomphastica flava*, two males from Golspie, September, 1900. — Mr. H. K. Donisthorpe exhibited (1) a specimen of *Drusilla canaliculata* with the dead body of a *Myrmica* in its mouth, captured at Chiddingfold on July 17th; (2) specimens of *Myrmedonia collaris* and its larva taken in Wicken Fen with *M. lævinodis* in August, 1900.—The Rev. F. D. Morice exhibited a remarkable hermaphrodite of the bee *Podalirius* (=*Anthophora*) *retusus*, in which the male characters were confined to the left side of the head and genitalia, the right side of the thorax and the abdominal segments. The antennæ and hind (pollinigerous) legs were those of a female, and the genitalia half of each sex.—Dr. Chapman exhibited beetles of the genus *Orina*, and remarked on the fact that while some were viviparous others were oviparous, in some cases of the former the larvæ being developed in the ovaries.—Mr. H. J. Elwes exhibited a collection of Lepidoptera from Greece, taken this season in conjunction with Miss Fountaine, in the Morea and in the Parnassus region. He remarked that the country about Athens was much dried up and overrun with goats and herds, and that therefore the lepidopterous fauna there was poor. On the south side of the Gulf of Corinth, however, the Pieridi were well represented, and out of eight European species seven were taken in three weeks. The spring and summer broods of *Pieris krueperi* this year were flying together—an unusual occurrence, possibly due to the rainy spring. Among other notable species, albinos of *Colias heldreichi* (female) were taken, *G. rhamni* var. *farinosa*, and *Lycæna ottomanus*, while Mr. Elwes further expressed his opinion that a Lycæna taken as a var. of *L. semiargus* was a distinct species. Miss Fountaine mentioned in connection with these exhibits that *Colias heldreichi* swarmed on Mount Kelmos from 4000 to 7000 feet; and Mr. Elwes remarked that Miss Fountaine was the first British collector known to have captured this insect.—Mr. H. H. May exhibited a variety of *Strenia clathrata* taken on the South Downs, in which the ground colour of the wings was of a uniform dark chocolate brown, not unlike *Syrichthus alveolus* on the wing.—Mr. F. Enock exhibited a male bee, *Stelis aterrima*, one of the bees parasitic in the nests of *Osmia fulviventris*, usually considered a rare insect. The specimen was taken on August 14th, 1900, in a garden at Holloway. Mr. Enock announced that he had also taken *O. fulviventris*, its host, in the same metropolitan locality.—Papers were communicated on "Descriptions of new species and a new genus of South American Eumolpidæ, with remarks on some of the genera," by Mr. M. Jacoby; and on "Lepidoptera Heterocera from Northern China, Japan, and Corea" (Part IV.), by Mr. J. H. Leech, B.A., F.Z.S., &c.—C. J. Gahan and H. Rowland Brown, *Hon. Secs.*

South London Entomological and Natural History Society.—*June 28th*, 1900.—Mr. W. J. Lucas, President, in the chair. Mr. Kemp exhibited (1) a var. of *Bombyx rubi* in which the band on the fore wings was bifurcated; (2) a var. of *Polyommatus icarus* having a large bleached blotch on the fore wing; (3) several specimens of *Notonecta glauca* and of var. *maculata*. Mr. Main, the nest of *Polistes gallica*, a solitary wasp, and a living example, from Switzerland, where it was common on rocks. Mr. Lucas, specimens of the very rare dragonfly, *Ischnura pumilio*, and var. *aurantiacum*, from the New Forest, where Mr. Carr and himself had rediscovered it, it not having been recorded for many years. Mr. West, specimens of Heteroptera, *Monanthia amplicata* and *M. cardui*, from Lewisham.

July 12*th*.—The President in the chair. Mr. Adkin exhibited pupa-cases *in situ* of the four Sesias, *S. scoliiformis*, *S. asiliformis* (*cynipiformis*), *S. culiciformis*, and *S. ichneumoniformis*; a long discussion ensued as to the economy of the various species in the genus. Mr. Hall gave his experience with *S. sphegiformis*. Mr. Tutt remarked how little was known of the egg stage, or even where the ova were laid. It was suggested that some were laid on the leaves. Mr. West, the uncommon hemipteron *Graphocrærus ventralis*, taken in Lee by sweeping. Mr. Carr, (1) specimens of the dragonfly *Pyrrhosoma nymphula* and vars., taken in the New Forest; (2) a very varied series of *Angerona prunaria*, from Hailsham; (3) a series of *Melitæa athalia*, also from Hailsham, where it was fairly common round the flowers of cow-wheat. Mr. Lucas, the rare dragonfly *Orthetrum cancellatum*, and a discussion ensued on the nature of the blue colour. Mr. Turner, a short series of a rare hemipteron, *Eysarcoris melanocephalus*, taken by beating and sweeping at Horsley on July 7th.

July 26*th*.—Mr. A. Harrison, F.C.S., F.L.S., Vice-President, in the chair. Mr. F. M. B. Carr exhibited a specimen of *Cosmia pyralina*, taken at Oxshott. Mr. Harrison, a series of *Nyssia zonaria*, taken on the golf-links at Wallasey, where it was common. Mr. West, the heteropteron *Mecomma ambulans*, from Lewisham. Mr. Ashby, a series and a living example of *Aromia moschata*, from Tottenham, where it was locally common. Several members recorded *Colias edusa*, *Plusia gamma*, *Pyrameis cardui*, and one *C. hyale*.

August 9*th*.—Mr. A. Harrison, F.L.S., Vice-President, in the chair. Mr. H. Moore exhibited specimens of *Sirex gigas* taken in Rotherhithe; and three species of Orthoptera taken by himself in Folkestone Warren, viz.:—*Leptophyes punctatissima*, *Thamnotrizon cinereus*, and *Platycleis grisea*. Mr. Adkin, a series of *Melanippe fluctuata* taken this year, and commented on the three main types of variation in the central band. Mr. Carpenter, two nests of a leaf-cutter bee found in the folds of an old sack. It was remarked that all bees emerged about the same time; the inmates of last made cells first. Mr. Blenkarn, a very fine smoky variety of *Cosmotriche* (*Odonestis*) *potatoria*, bred, from Eastbourne. Mr. F. M. B. Carr, a long bred series of *Lymantria* (*Psilura*) *monacha*, and contributed notes. The larvæ were from the New Forest.

August 23*rd*.—Mr. A. Harrison, F.L.S., Vice-President, in the chair. Mr. R. Adkin sent for exhibition flower-heads of ivy from Eastbourne, and contributed notes on the eggs of *Cyaniris argiolus*; also flowers of the common *Euonymus* of the gardens. Mr. West, the following Hemiptera, all taken at Lee: *Oliarus panzeri*, on willows;

Idiocerus tremulæ, on aspens; *I. vitreus*, on poplars; *I. albicans*, on white poplar; *I. confusus*, on sallows; *I. laminatus*, on Lombardy poplars; and *I. populi* on aspens; together with a larva of *Dicranura bifida*, from West Wickham. Dr. Chapman exhibited series of specimens of *Melanippe fluctuata*, from Red Hill and from the Southern Alps. They were almost identical. Mr. Blenkarn, specimens of *Cosmotriche* (*Odonestis*) *potatoria* and *Lasiocampa* (*Bombyx*) *quercus* var. *callunæ* from Eastbourne; *Spilosoma lubricipeda* var. *radiata* from Yorkshire; *Mesotype virgata* (*lineolata*) from Margate; and *Triphosa dubitata* from East Dulwich.

September 13*th*.—The President in the chair. Mr. F. Noad Clarke exhibited a specimen of *Locusta viridissima*, taken at Deal. Mr. South, a bred series of *Zygæna trifolii* from marsh near Oxshot. The cocoons were found well up the stems, as well as near the base of the grass. The specimens were identical with those taken in a meadow near Northwood; Mr. Lucas, several specimens of *Thamnotrizon cinereus*, an Orthopteron he has taken in the New Forest. Mr. Colthrup, a short series of *Lasiocampa* (*Bombyx*) *quercus*, from Margate. Mr. Kemp, a specimen of *Aplecta occulta*, taken at sugar near Cromer. Mr. Turner, series of the following Coleoptera, taken this year: *Crioceris asparagi*, from Petersfield; *Liopus nebulosus* and *Strangalia armata* from the New Forest; and *Clytus arietis* from Abbot's Wood. Mr. West, the Hemipteron *Derephysia foliacea*, beaten from ivy at Blackheath. Mr. Lucas, a series of the white variety of *Helix ericetorum*. Mr. Barnett, a specimen of *Polyommatus corydon*, of a curious brown coloration. Mr. Buckstone, a female specimen of *Æschna mixta*, taken at Shoreham in Kent, where he had met with a number. Mr. H. Moore, the following species of Lepidoptera, taken at Le Portel near Boulogne: *Colias edusa*, *C. hyale*, *Pyrameis cardui*, *P. atalanta*, *Vanessa io*, *Aglais urticæ*, *Polyommatus icarus*, *Papilio machaon*, and read notes. Mr. Bishop read the report of the field meeting held at Horsley on July 7th.

September 27*th*.—The President in the chair. Mr. Ashby exhibited a fine variety of *Rhagium bifasciatum* taken at Rickmansworth, having a large yellow patch across the elytra in place of the usual spots; a series of *Sinodendron cylindricum* from a beech stump at the same place; a very small specimen of *Pieris rapæ;* and a var. of *Abraxas grossulariata*, having the right wings typical, but the left wings much radiated with black lines. Mr. Adkin, short series of *Moma orion* from Essex and the New Forest. Mr. Carpenter, series of *Colias hyale* from Sheerness, including the pale form, and gave particulars as to the habits of the larvæ of both *C. hyale* and *C. edusa*. Mr. Montgomery, living larvæ of *C. edusa*, and commented on the long time taken in feeding up this year, owing, doubtless, to the want of sunshine. Mr. Lucas, the Orthoptera, *Platycleis grisea* from Lulworth, and *Tettix subulatus* from Milford. Mr. Main, specimens of Myriapoda and Arachnids from West Africa. Mr. F. M. B. Carr, series of dragonflies taken this year: *Sympetrum striolatum*, *S. sanguineum*, and *S. scoticum*, from Ockham; *Libellula depressa*, *L. quadrimaculata*, *Orthetrum cærulescens*, *Gomphus vulgatissimus*, *Cordulegaster annulatus*, and *Brachytron pratense*, from the New Forest; *Æschna grandis* from Wisley; and *Æschna mixta* from Loughton. Mr. Hy. J. Turner, *C. edusa*, taken at Dawlish, including var. *helice* and a small female with a pale yellow costa. He also showed a pair of *Æschna mixta* taken with two others at Pitsea. Mr. Chittenden, a pale yellow var. of *Chrysophanus phlœas* from Ashford; two very dark *Gnophos obscuraria* from Shirley; a specimen of *Bupalus piniaria* from West Wickham, having the right wings male and the left wings female; and a dark form of *Agrotis aquilina* from Shirley. Mr. Colthrup, on behalf of Mr. Hills, of Folkestone, a long series of *C. hyale*, showing pale forms of both male and female, and one specimen with dark hind wings closely resembling *C. edusa* var. *helice*. Mr. R. Adkin read the report of the field meeting held at Paul's Cray Common on September 22nd.

October 11*th*. — The President in the chair. Mr. R. Adkin exhibited series of the spring and summer broods of *Zonosoma porata* and *Z. punctaria* bred from Sussex ova, and pointed out their resemblances and differences. Mr. Lucas, on behalf of Mr. Jennings, the Hemiptera, *Ptilophorus perplexus* from oak at Edmonton, and the rare *Monanthia ciliata* from near Dorking, together with a very dark form of the common earwig, *Forficula auricularia*. Mr. B. Adkin, fine bred specimens of *Boarmia repandata* from the New Forest; bred *Cleora glabraria*, including a fine suffused variety; and various forms of *Noctua castanea* (*neglecta*). Rev. H. Wood, a specimen of the rare Longicorn, *Astynomus ædilis*, taken at Northampton. Mr. Jäger, short series of *Stilbia anomala*, *Lithosia caniola*, *Noctua castanea*, *Laphygma exigua*, and *Leucania putrescens*, with specimens of *Epunda lichenia*, *L. albipuncta*, *L. vitellina*, *Heliothis armigera*, and *Colias edusa* var. *helice*, all taken in South Devon in August and September this year. Mr. Lucas, varieties of *Pyrrhosoma tenellum* (1), a female, with bronze abdomen; (2) a female, with abdomen crimson, except black circlets at the junctions of the segments: both from the New Forest. Mr. Kaye, series of British Lycænids, and closely-allied species of Lycænids from Japan, including *Chrysophanus phlœas*, British and Japanese; *Polyommatus argia*, Japan, to compare with *P. icarus; Plebius ægon*, British and Japanese; *Cyaniris argiolus*, British and Japanese; a Japanese *Everes argiades;* and contributed notes on the variations. Mr. Mason, a Phasmid from Borneo. Mr. McArthur, a long series of brilliant specimens of *Argynnis aglaia* taken near Brighton. Mr. West, a series of a Homopteron new to Britain, *Typhlocyba candidula*, beaten from white poplar on Blackheath. Mr. Turner, on behalf of Mr. Edwards, a long series of *Saturnia pavonia* bred from ova laid by a female captured in April, 1898, at Digne. The first portion, twenty-one males, emerged in 1899; the second portion, two males and seven females, emerged in 1900; and two pupæ remained over, but had since died. Mr. Blenkarn reported that he had taken the rare *Ischnura pumilio* in Abbot's Wood. Dr. Chapman, specimens of *Cnethocampa pityocampa*, prepared to show the frontal apparatus for forcing an exit from the tough cocoon, which process he explained was also assisted by the special development of the first pair of imaginal legs.—Hy. J. Turner, *Hon. Report Sec.*

Birmingham Entomological Society.—*July* 16*th*, 1900.—Mr. G. T. Bethune-Baker, President, in the chair.—The Rev. C. F. Thornewill was elected a member of the Society. A letter was received from Mr. G. H. Kenrich, announcing his purchase of the late Mr. W. G.

Blatch's special collection of Midland Coleoptera for the City of Birmingham, and his intention of placing it in the charge of this Society until Birmingham had a museum to receive it.—Mr. R. C. Bradley exhibited a series of *Libellula depressa* taken at various places this year—Selsley, Glos., Moseley, London, &c.—and remarked that it appeared to have been exceptionally abundant and widely distributed this year.—Mr. C. J. Wainwright showed short series of *Trypeta onotrophes* from St. Ives, Cornwall, and *T. tussilaginis* from West Hide, Hereford.

August 20*th*.—The President in the chair.—Mr. R. C. Bradley exhibited *Cucullia chamomillæ* from his garden at Moseley, and living larvæ of *Acronycta aceris* from North London.—Mr. G. W. Wynn exhibited a very beautiful and varied series of *Triphæna fimbria*, bred from larvæ found at Marston Green last April and May. The upper wings varied from a light creamy brown to a dark brown, nearly black, and one specimen was of the rarer mahogany colour. He also showed *Cucullia chamomillæ* from Solihull.—Mr. G. T. Bethune-Baker mentioned that a friend had taken fifteen *Plusia moneta* in a garden in Surrey this year, an increase on the number of any former year, and tending to show that the species is becoming well established in England. All members remarked on the unusual abundance of *Plusia gamma* this year; the President and Mr. Bradley had specially noticed its great numbers locally, and Mr. Wainwright had seen it swarming on the north coast of Norfolk in clover fields; they all seemed to think, however, that the specimens were fresh and in good condition, scarcely suggesting immigration.—Mr. Bethune-Baker showed a drawer full of Palæarctic *Pararge* and *Epinephele*.

September 17*th*.—The President in the chair.—Mr. R. C. Bradley mentioned the occurrence of *Colias edusa* (two specimens) in his garden at Moseley. A discussion followed on its occurrence this summer. Mr. H. Willoughby Ellis had seen it on the railway-bank near Wednesbury, and had heard of it at Bromsgrove. Mr. P. A. Jackson had met with it in great abundance in Normandy, and wondered whether it usually occurred there in great numbers, or if it were specially common there this year as well as here.—Mr. G. T. Bethune-Baker asked if members had noticed the Vanessidæ in unusual abundance this year; he had seen many more than usual at Edgbaston. Mr. W. Harrison thought they were more abundant than usual, and mentioned the occurrence of *Grapta c-album* at Harborne.—Mr. H. W. Ellis mentioned the finding of twenty-eight larvæ of *Acherontia atropos* in Bedfordshire; he also had it from Knowle, Warwickshire; and asked what the experience of others was. Other members had heard of its occurrence locally, and Mr. Wainwright had received a specimen from Cromer, Norfolk.—Mr. R. C. Bradley showed a series of *Dioctria atricapilla* from Stroud district; also a few *Leptogaster guttiventris* from same place, and *L. cylindrica* from Haywood, Warwickshire.—Mr. W. Harrison exhibited living pupæ of *Nemeobius lucina* from Witherslack, and mentioned its probable extermination there, as he had counted thirty-two entomologists hunting specially for that species and *Lycæna minima*.—Mr. H. W. Ellis showed a nice lot of Coleoptera collected in the Stroud district of Gloucestershire during the Society's visit there at Whitsuntide this year;

in five days he had taken ninety-four species, including *Oodes helopioides*, *Phytæcia cylindrica*, *Cryptocephalus bipunctatus*, *Chrysomela varians*, a pair of the green var. in cop., *Lochmæa cratægi*, *Cistela luperus*, *Magdalus armigera*, and *M. pruni*.—Mr. Bethune-Baker exhibited a pair of *Plusia moneta* taken by a friend in Surrey this year; also a series of *Pararge* of the *egeria* group, to show the difference between Continental *egeria* and our *egerides* and their allies *xiphiodes* from Canary Islands, and *xiphia* from Madeira.—Colbran J. Wainwright, *Hon. Sec.*

Lancashire and Cheshire Entomological Society.—The first meeting of the session of 1900–1901 was held on October 8th, 1900 (in the Free Library, Liverpool). The Vice-President, Mr. B. H. Crabtree, occupied the chair.—Dr. J. Cotton exhibited captures made on Simonswood Moss and at Llandudno during 1900. The former included a specimen of *Acronycta alni*.—Mr. B. H. Crabtree exhibited *Colias edusa* and series of *Agrotis cursoria* from St. Annes-on-Sea, also a curious variety of *Arctia caia*, in which the upper wings were almost unicolorous dark brown, and the under wings yellow with a dark brown mark at the base of each.—Mr. Crabtree also showed, on behalf of Mr. Harold Milne, two singular varieties of *A. plantaginis*, in which the black markings were replaced by a yellowish orange tint, thus causing them to appear almost unicolorous. These specimens were male and female!—To mention all the remarkable species in Mr. Day's interesting exhibit would take too much space; amongst them were the following:—a fine dark form of *Smerinthus tiliæ*, a series of *Chærocampa porcellus*, long and fine series of *Eulepia cribrum*, *Notodonta cucullina*, *Agrotis ripæ*, and *Anticlea sinuata*, the latter from Cambridgeshire larvæ.—Mr. Mason exhibited a magnificent series of *Pyrameis cardui*, *Argynnis aglaia*, *Bombyx trifolii* (bred), *Agrotis ripæ*, *A. cursoria*, and other coast species. Amongst his odd captures were *A. pyrophila* and *Colias edusa*, taken at Lytham.—Mr. Massey showed long series of the beautiful and local *Pachnobia alpina*, *Tæniocampa gothica* and its mountain form *gothicina*.—Mr. Tait exhibited fine series of *Melitæa cinxia*, *Agrotis corticea*, *A. lunigera Acidalia humiliata*, and *Anticlea rubidata* from the Isle of Wight, also the living larva and imago of *Agrotis ashworthii*.—Mr. Thompson recorded *Colias edusa*, *Acherontia atropos*, and *Macroglossa stellatarum* from St. Helens, the latter abundant in the larval state in suburban gardens.—Mr. Pierce brought for exhibition a living *A. atropos*, which stridulated loudly on being disturbed.—Mr. Johnson exhibited bred series of *Notodonta cucullina*, and the lovely *Phorodesma smaragdaria*, also a specimen of *S. populi*, in which the pink of the under wings was suffused all over the insect. Amongst Mr. Johnson's other insects were *Zygæna minos*, *Sesia philanthiformis*, and *Carsia imbutata*.—Mr. Prince exhibited splendid series of *Erebia blandina*, *E. cassiope*, *Epinephele hyperanthus*, *Gonopteryx rhamni*, *Leucophasia sinapis*, *Thecla quercus*, and *Lycæna ægon*. Besides these north country captures he showed long series of coast species.—Mr. Collins brought for exhibition a part of his collection of Geometrina. It included specimens of a large number of the British Eupitheciæ, whilst *Melanthia* and *Melanippe* were also well represented by their beautiful species *albicillata*, *hastata*, &c.—Frederick Birch, *Joint Secretary.*

RECENT LITERATURE.

Recent Work on Japanese Rhynchota.

Uhler (P. R.). *Summary of the Hemiptera of Japan* (1896, Proc. U. S. Nat. Mus. 276–97).

Nawa (Y.). *The Insect World.* A Monthly Magazine. Vols. I.–IV. (in part), 1897–1900.

Horvath Geza. *Hémiptères de l'île de Yesso* (*Japon*) (1899, Termész. Füzetek, xxii. 365–74).

Matsumura Shonen. *Uebersicht der Fulgoriden Japans* (1900, Ent. Nachr. xxvi. 205–13 and 257–70).

The extraordinary interest attaching to the entomological features of Japan renders any precise and detailed information particularly welcome, especially to the student of geographical distribution. Explorers and passing travellers have rendered good service in making known its rhynchotal treasures, but the scientific study of any special fauna is scarcely placed on a satisfactory footing until native or foreign residents apply themselves to its elucidation in the country itself. Mr. Nawa, of Gifu, has been collecting the Japanese Rhynchota for some little time, and inciting his friends and neighbours to emulation in the same pursuit, though, unfortunately, Mr. Nawa's observations have, until recently, been published entirely in Japanese. The mere fact that his journal, 'The Insect World,' a monthly magazine of some forty pages a month, entirely (except the title) in Japanese, is now well towards the completion of its fourth year, is an eloquent testimony to the grip that entomology has taken of our far-eastern *confrères*, though the language in which it is couched must necessarily limit its audience in the west. We ourself can only say that notes of rhynchotal interest have appeared from time to time, as evidenced by the figures of *Corixa substriata*, various Ricaniinæ and Cixiinæ, as well as of a number of others un-named. In the seventh number of the third volume (July 15th, 1899) two photographs are reproduced (plate vii.) of the *personnel* of an entomological expedition, numbering some forty individuals, a muster which puts to shame some of the field-meetings of our most flourishing London societies. Mr. Nawa is much to be congratulated and applauded for the excellent work he is doing in popularising the study of insects among his countrymen.

His collections have, in part, also lately been scientifically worked out by Dr. Uhler, the veteran rhynchotist of Baltimore, and by Dr. Matsumura. The bugs exhibited at the World's Columbian Exhibition in Chicago, and subsequently presented to the U. S. National Museum through Dr. Mitzukuri of Tokio, were (we learn from Dr. Matsumura) collected by Mr. Nawa; six new genera and close upon fifty new species* were then added to science. Quite recently Dr. Matsumura has given a memoir on the Fulgoridæ of Japan,* with four new genera and twenty-two new species (of which two genera and fifteen species are obscure Delphacinæ [Asiracinæ]). Lastly, the well-known and genial Director of the Budapest Museum has contributed a short paper on some bugs from Yesso, collected by Dr. Matsumura.†

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* "*Limnotrechus elongatus*," Uhler, does not belong to *Limnotrechus* (i. e. to the typical subgenus of *Gerris*); the descriptions of the antennæ and of the connexival spines proclaim it a "*Limnometra*" (or possibly a "*Limnoporus*"). There is probably a misprint in the first three ines of p. 275.

Of the Fulgoridæ enumerated by Dr. Matsumura, only a single species [*Stenocranus minutus*, Fabr.] is also European or Siberian (although nine of the genera have a European distribution); on the other hand, of the fifty miscellaneous species mentioned by Dr. Horváth, thirty also inhabit Eastern Siberia; while only five genera are not represented in Western Europe, and only one genus (*Riptortus*) is non-palæarctic.

G. W. K.

E. P. Felt. *Fifteenth Report—Insects—State of New York*, 1899 (Bull. N. Y. State Mus. VI. No. 31, June, 1900, pp. 531–653).

The present annual report (Dr. Felt's second) is of somewhat different nature to most of its predecessors, as "pressure of other work has prevented the preparation of the usual detailed notices of injurious insects observed during the year." These are promised at some future time. We may briefly note, among the more interesting entomological features, the excessive injuries occasioned by the forest tent caterpillars (*Clisiocampa disstria*), the elm-leaf beetle (*Galerucella luteola*), and the "willow butterfly" (*Euvanessa antiopa*); and the occurrence in several counties of seventeen-year Cicada (*Tibicen septendecim*.)‡

The stoppage of railway trains by hordes of caterpillars has been regarded usually with a good deal of scepticism; but an observer, quoted by Dr. Felt (p. 542), states that a train by which he was travelling was stopped three times between two stations about eight miles apart.

The principal feature of the report is an account of the work of a corps of forty-three voluntary observers (representing thirty-nine counties), established to bring "the entomologist into closer relations with the public, and also to facilitate the gathering of information." Twenty-five pages are occupied by the information thus gained.

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* We would correct the synonymy of one species, viz. "*Pœciloptera distinctissima*, Walker," p. 213. The type of *Pœciloptera* [recte *Pœkilloptera*, Latr., 1796] was fixed by the author himself as *phalænoides*, Linné, a very distinct neotropical species; in fact, the genus is (to our knowledge) not found in the Old World at all, although innumerable species under that generic name have been even recently described from India, Ceylon, Java, &c. *P. distinctissima* forms probably a new genus near *Flata* and *Ormenis*. Dr. Melichar, of Vienna, whose recent important 'Monographie der Ricaniiden' was noticed in the 'Entomologist' (1899, p. 263), is now engaged upon a monograph of the Flatidæ (more properly Pœkillopterinæ), so that numerous details, now obscure, in this group, will doubtless soon be elucidated.

† Dr. Matsumura has also published an account of the Cicadidæ of Japan (Annot. Zool. Japon. ii. pp. 1–20, pl. 1; see Zool. Record, 1898); but we regret that we have not yet been able to see a copy.

‡ Most American entomologists refer to this species as *Cicada septendecim*. It may well be termed the "seventeen-year Cicada"; but it is quite as incorrect (if not more so) to write of "*Cicada septendecim*," as it would be to speak of "*Argynnis cardui*" or "*Vanessa aurinia*."

Dr. Felt has worthily maintained the reputation of these reports, acquired during Dr. Lintner's tenure, of being among the most completely indexed of any entomological publications.

G. W. K.

The Lepidoptera of the British Islands: a Descriptive Account of the Families, Genera, and Species indigenous to Great Britain and Ireland, their Preparatory States, Habits, and Localities. By Charles G. Barrett, F.E.S. Vol. vi., pp. 388. London: Lovell Reeve & Co. 1900.

In this volume consideration of the Heterocera is continued up to the end of the Noctuina, and a commencement is made with the Geometrina. The names of genera in the Noctuina are but very little changed, and the only important alteration in the arrangement is the introduction of the Sarrothripidæ, which family is placed between the Trifidæ and the Gonopteridæ. In his treatment of the Geometrina our author adopts the classification used by Hampson in his 'Moths of India,' consequently the family first dealt with is the Boarmidæ, which, in the present instalment, includes the genera *Ourapteryx* [*Uropteryx*], *Angerona*, *Rumia*, *Venilia*, *Cabera*, *Macaria*.

Among the Noctuina we note that *Acontia solaris*, *Catocala electa* ("casual migrant"), *Chariclea delphini*, *Cucullia abrotani*, *Plusia illustris*, *P. ni*, and *Thalpochares paula* are admitted as British; whilst *Acontia catena*, *Bryophila algæ*, *Calophasia linariæ*, *C. platyptera*, *Catocala elocata*, *Plusia aurifera*, *P. verticillata*, and *Hypena obsitalis* are regarded doubtfully, or at best as only accidental visitors.

Catalogue of Eastern and Australian Lepidoptera Heterocera in the Collection of the Oxford University Museum. Part I.—Sphinges and Bombyces: by Col. C. Swinhoe. Part II.—Noctuina, Geometrina, and Pyralidina: by Col. C. Swinhoe. Pterophoridæ and Tineina: by the Rt. Hon. Lord Walsingham and John Hartley Durrant. (Oxford: Clarendon Press. 1892 and 1900.)

The entomological collection of the Oxford Museum is the most important public collection in this country, after the British Museum, and contains a great number of types of moths, described by Hope, Westwood, Walker, and Moore. The whole collection has now been thoroughly examined, and the types, as far as possible, identified; and we have the result, so far as regards the Eastern species, in the two handsome volumes before us, each illustrated with eight coloured plates, though, for some reason or other, those in the second volume do not appear to us to be quite as good as those in the first. The book cannot fail to be of great value to all entomologists who are interested in foreign moths; and we can only regret that it has not been made complete by the addition of the African and American moths.

We should add that the new species and genera which the authors met with in the course of their work are fully described in its pages, thus bringing the catalogue of this part of the Museum up to date.

Transactions of the City of London Entomological and Natural History Society for the year 1899. Pp. 80. Published by the Society at the London Institution, Finsbury Circus, E.C. 1900.

The entomological papers in this volume are as follows:—"Notes on *Spilosoma lubricipeda*," by A. W. Mera, pp. 29–32; "The Life-history of *Oporabia* (*Epirrita*) *autumnata*, Bkh.," by Louis B. Prout, pp. 42–52; "Notes on *Eupithecia coronata*, Hübn.," by L. B. Prout, pp. 52–54; "Variation in the broods of *Axylia putris*, *Cucullia umbratica*, *Spilosoma urticæ*, and *Malacosoma castrensis*," by A. Bacot, pp. 54–58; "Some Marsh Beetles of the Lea Valley," by F. B. Jennings, pp. 59–65. Mr. Prout also contributes another instalment of the list of "Lepidoptera of the London District" (pp. 66–80), which had been commenced in this Society's 'Transactions' for 1898. The number of species enumerated, so far, is 369. Among other interesting matters contained in the "Reports of Meetings" (pp. 2–28), we note that, on January 3rd, 1899, Dr. J. S. Sequeira exhibited a specimen of *Catocala elocata*, "which had been recognised, by Mr. E. M. Dadd, in Dr. Sequeira's series of British *C. nupta*. The Doctor said he had no doubt that the specimen was set by himself, and that the insect was taken unawares in these islands. This would be the first record of the species in Britain." The latter remark is not correct, as this species has been previously *recorded* as British: Curtis, very nearly eighty years ago, figured, as a British insect, an example of *C. elocata*, which was assumed to have been captured in this country. It was afterwards discovered that this species had been received from Oporto by the owner of the collection of British Lepidoptera in which it was detected.

OBITUARY.

Dr. Otto Staudinger.—We have received intimation of the death of Dr. Staudinger, on Oct. 13th last, at Lucerne, in his seventy-first year. He was incontestably one of the best known continental lepidopterists, and, since the death of Herrich-Schäffer, the leading German authority on Palæarctic Lepidoptera. His inaugural dissertation, 'De Sesiis agri Berolinensis,' which appears to have been also his first published work, is a quarto tract of sixty-six pages, with two plates, published at Berlin in 1854. Subsequently he travelled in Iceland, Norway, Sardinia, and Spain, and the results of his captures were published in the 'Stettiner Entomologische Zeitung' by himself and others. The most important of these early journeys was that which he undertook to Iceland, an interesting account of which was published in S. E. Z. for 1857.

In 1861 appeared the first of the great works which have made his name famous—the first edition of the 'Catalog der Lepidopteren Europas und der angränzenden Länder. I. Macrolepidoptera, bearbeitet von Dr. O. Staudinger. II. Microlepidoptera, bearbeitet von Dr. M. Wocke.' This was in double columns, and resembles in form Heydenreich's 'Systematisches Verzeichniss der europäischen Schmetterlinge,' the third and last edition of which appeared at Leipzig in 1851. The second revised and enlarged edition of Staudinger's and Wocke's Catalogue, printed in single columns, appeared in 1871; and we may remark that Dr. Staudinger's portion of this work, though, of course, not absolutely free from errors, is far superior to that of his coadjutor, Dr. Wocke, especially as regards the completeness and accuracy of its quotations from English authors. The book, however, does not include the whole Palæarctic Region; Japan, North China, Egypt, &c., not being included.

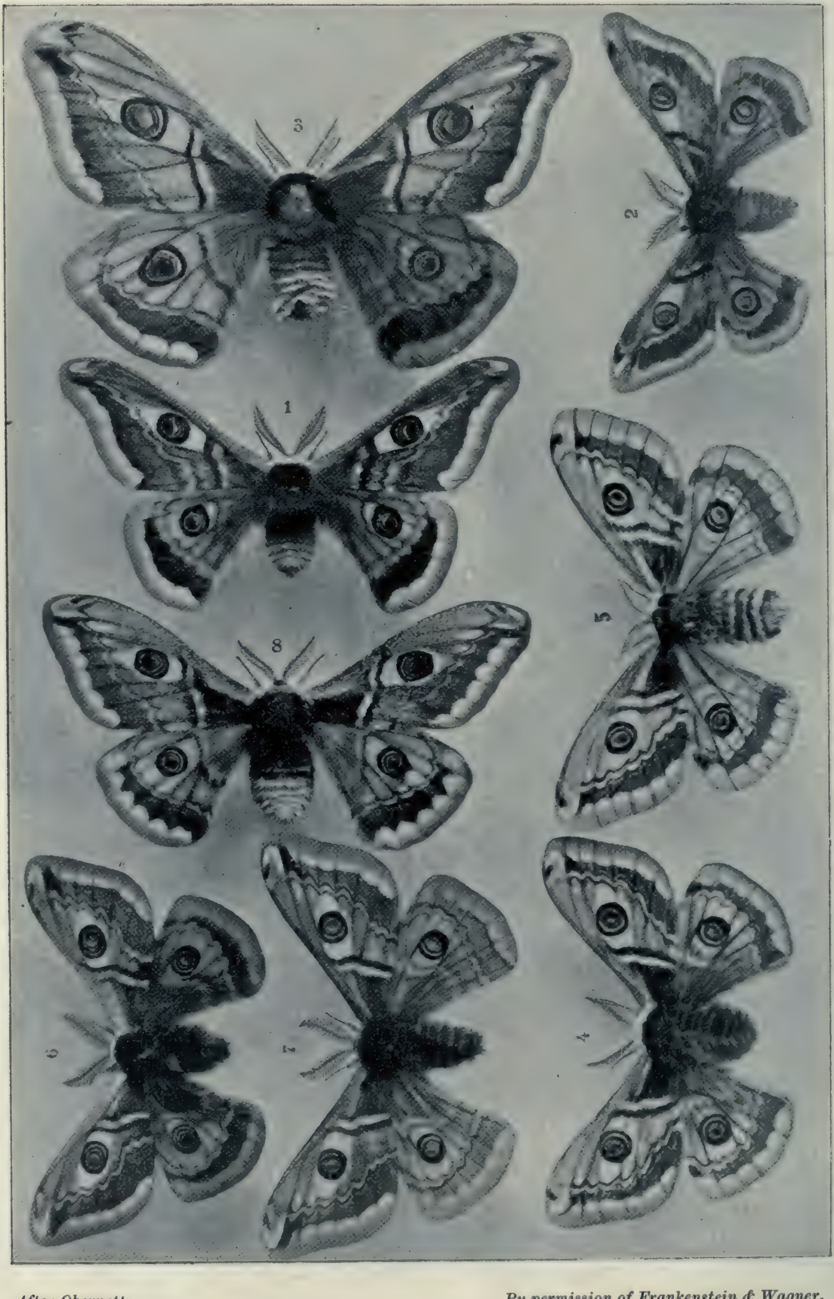
Dr. Staudinger took up his residence at Blasewitz, near Dresden, where he established, at first alone, and subsequently in partnership with his son-in-law, Bang Haas, a Swede, an enormous emporium for the sale of European and exotic insects, especially Lepidoptera, and issued a continuous series of price-lists for many years, which were circulated all over the world. He had been a great invalid for some years before his death, and this retarded the publication of the long-promised third edition of his great Catalogue of Palæarctic Lepidoptera, undertaken with the co-operation of Dr. H. Rebel. We hope that this is practically ready for publication, and will shortly be issued; but even though this should be the case, and although we should not grudge an old man a well-earned holiday, we cannot help regretting that he was not able to see it through the press during his own lifetime.

Dr. Staudinger continued to travel much in various parts of Europe, and perhaps North Africa, but we are not aware that his travels led him further. He occasionally visited London, but only rarely, and at long intervals. He also issued from time to time most valuable papers on the Lepidoptera of the less-known parts of the Palæarctic Region, founded on the extensive collections formed for him by various collectors. Among these were his "Beiträge zur Lepidopterenfauna Griechenlands," which fills the greater part of the seventh volume of the 'Horæ Societatis Entomologicæ Rossicæ' (1870), and numerous papers on the Lepidoptera of various parts of Northern and Central Asia, published in various periodicals, chiefly German and Russian, but which it would take up too much space to enumerate here.

But by far the most important work of the latter part of Dr. Staudinger's life, and also almost his only important publication relative to exotic Lepidoptera, was his 'Exotische Tagfalter in Systematischer Reihenfolge, mit Berücksichtigung neuerer Arten, unter technischer Mitwirkung von Dr. H. Langhans.' It is a thick volume in small folio, published at Fürth, in Bavaria, from 1884 to 1888, and illustrated by one hundred crowded plates of butterflies. Notwithstanding the title, European and Palæarctic species are included in their places, making the book by far the most complete which has appeared on the subject of butterflies in general, though it is issued at a comparatively moderate price. It was accompanied by a second volume, by Drs. Schatz and Röber, with characters of the families and genera, illustrated by thirty-six plain plates of neuration. In this latter work, however, the genera of Hesperiidæ are not included.

We have spoken only of Dr. Staudinger's scientific work, but no doubt other obituaries will appear, written by entomologists who were more intimately acquainted with him than the present writer, and who may be able to supply particulars of general interest relating to his personal history.

W. F. K.



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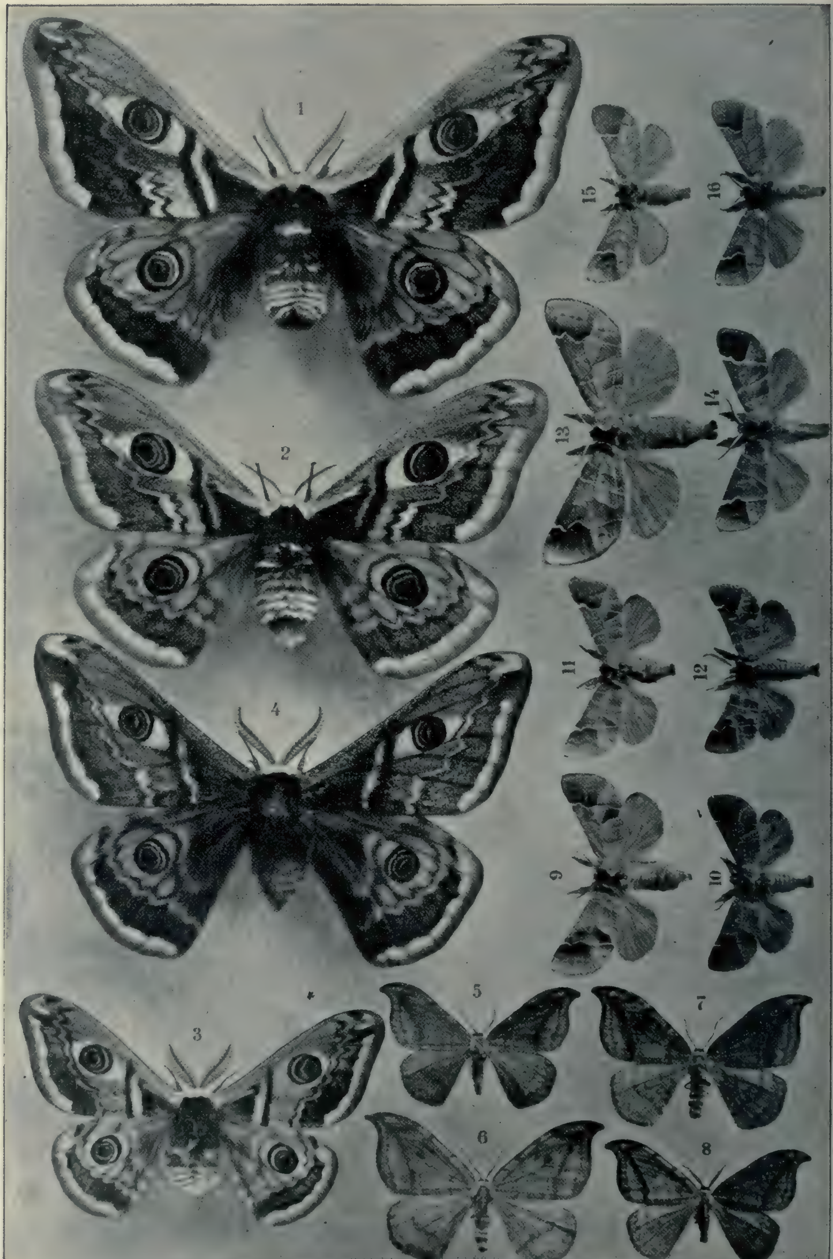

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EDITORIAL.

Reference is made to the very liberal Plate illustration of the present volume only to afford me an opportunity of tendering my sincere thanks to Messrs. Adkin, Christy, Lucas, and Merrifield for their generous assistance, which has enabled me to add so much to the interest and scientific value of the contents of the 'Entomologist.'

The Special Index has become so voluminous that its publication in the last number of the year would cause considerable delay. I have therefore decided to issue this section of the Index in the January number of each year. Subscribers will receive it free as heretofore.

An Alphabetical List has been prepared of all the figures of varieties of British Lepidoptera published in the 'Entomologist' up to date. This was made for my own use; but, as I understand that a convenient reference to these figures would be useful to many, it will be presented with the Special Index in the 'Entomologist' for January, 1901. An Index of all the varieties described in the Journal since its establishment in 1840 will be published during the ensuing year.

In previous Editorials I have had occasion to acknowledge some kindly written criticisms, and equally kind advice given me from time to time by friends, concerning the subjects discussed or otherwise dealt with in this Journal. I am exceedingly obliged to all correspondents who during the past year have favoured me with suggestions which in their opinion would, if acted on, largely conduce to the prosperity of the 'Entomologist.' I can assure them that, although I fully appreciate their good-natured intentions, I think that it would not be to the advantage of the Journal to very materially alter its present character. Since it has been my valued privilege to conduct the Journal, its pages have been open to entomologists of every degree; contributions of the field-worker are as welcome as those of the systematist or the specialist. Judging from the large measure of support that I have received during the ten years or more that I have discharged the duties of Editor, I am inclined to believe that the absence of exclusiveness in the policy adopted meets with general approval.

Richard South.

LEPIDOPTERA IN SOUTH DEVONSHIRE.

By J. Jäger.

In anticipation of a late emergence of insects in general during the past season, I did not set out for my usual South Devon expedition until August 1st. Arriving at Babbicombe, where I met the Rev. Dobrée Fox suffering from a severe accident to his knee, I soon learned that, so far as *Leucania putrescens* was concerned, my calculation was wrong, for this insect had been out for some time, and, judging by the large series Mr. Fox showed me, they must have been very plentiful. However, in spite of wind and occasional rain, Mr. J. Clarke, of Reading, and myself worked for the species at one of its usual haunts with tolerably good results, for among the worn majority many specimens were obtained in good condition. Whilst engaged examining the flowers one night, we had the unique experience of attracting towards us the search lights of several British warships which happened to be in the bay. This afforded us great amusement, especially as the moths, like ourselves, seemed quite to enjoy it. *Lithosia caniola*, of which species during the previous year many specimens were netted at dusk near the same spot, were scarcely seen; towards the end of the week, however, they turned up in another part some distance off. *Acontia luctuosa* likewise was scarce and worn, probably owing to the continued absence of sunshine. This insect hides during dull weather, and has been noticed creeping right down into the cracks in the earth.

After staying a week at Babbicombe I went back to Starcross, and was informed that *Callimorpha hera* had appeared as early as July 4th, but after the spell of very hot weather at that time their emergence ceased, and became again general about

August 10th, the predominating form being decidedly the orange one. Other local species, usually common—as, for instance, *Cidaria picata*, and several Acidalias—were conspicuous by their absence, but *Acidalia marginepunctata*, *Gnophos obscurata*, *Melanippe galiata*, *Aspilates citraria*, *Eubolia lineolata*, and *Larentia olivata* were abundant. *Bryophila muralis* was taken, in the pupa state, by several friends of mine near Dawlish up to nearly the end of August in large numbers; these produced many examples of the dark brown form.

As regards *Colias edusa*, I have never before seen the species in such profusion as during the week following August 15th, and, remembering the great *edusa* year of 1877, when I happened to be on the East coast, I think that the past season, at least in Devonshire, ran quite parallel with it. They were simply swarming in the clover fields and lanes, and I might have taken fifty in an afternoon had I so desired. I captured a few of var. *helice*, but I did not see any *C. hyale*, although three or four specimens were said to have been taken by a local collector.

On August 24th, Mr. Porritt arrived, and we left Starcross for another locality, to work for some of the rarer Noctuas. The weather had by this time become settled, but, although fine and sunny during the day, we found the nights cold, with a bright moon. Sugaring, therefore, proved less profitable at first than anticipated. The democratic *Triphæna pronuba* and *T. comes*, *Agrotis segetum*, *A. suffusa*, *A. puta*, *Leucania pallens*, *Noctua plecta*, *N. c-nigrum*, *N. xanthographa*, *Amphipyra tragopogonis*, *Miana furuncula*, *Mamestra brassicæ* (second brood), and, somewhat later, *Agrotis saucia*, *Xanthia circellaris*, *Anchocelis rufina*, and *A. lunosa* were extremely common: likewise *Caradrina ambigua*, which continued on the wing quite a month. *Noctua castanea* var. *neglecta* also came freely to sugar. The first warm nights produced three *Leucania albipuncta*, singly, and on the evening of September 8th Mr. Porritt took five more, and one *Laphygma exigua* a few days later. One *L. albipuncta* had been taken on August 15th, and it was therefore a matter for congratulation that specimens of this species were still in good condition. Mr. Porritt had unfortunately to leave before me, and, working single-handed, I took five *L. exigua* on September 17th (a very warm and still night), and three more on the following nights. My other captures included *Leucania vitellina*, *Heliothis armigera*, *Epunda lichenea*, *Noctua glareosa*, *Nonagria lutosa*, *Hydrœcia nictitans*, *Calocampa exoleta*, *Heliophobus popularis*, *Acronycta rumicis* (second brood), *Noctua rubi*, *Cosmia diffinis* and *affinis*, *Polia chi*, *P. flavicincta*, and females of *Stilbia anomala* at sugar as late as September 17th; whilst a few males of the latter were netted flying among the gorse close at hand. After my departure on September 22nd, I have been informed that *Epunda nigra* and *E. lutulenta* were taken as usual at sugar on the ground I had left. As regards *L. exigua*, I should like to add that our specimens were all taken between 8.30 and 9 p.m., certainly not later. Mr. Woodforde's experience differs in this respect, for he says the insects appear mostly between ten o'clock and midnight. I have watched often until a late hour, but never took one later than nine o'clock, nor did I find any on very windy nights, although I do not maintain that they would not come on such nights. When once settled they are not at all shy, like many of their companions at sugar, but allow themselves to be easily boxed. The females lay their eggs readily, and I have at the present moment larvæ from four different parents. The ova, which were in batches completely enveloped in down, hatched within a fortnight, and the young larva took to knot-grass, leaving the reputed food-plant, plantain, untouched. They are now eating dock, but I question whether they will survive the winter, as they appear extremely delicate. The larva has been found in the wild state early in the summer on *Persicaria* near the coast. This would indicate that, as with *Caradrina ambigua*, there is an earlier brood of this insect.

65, St. Quintin's Avenue, North Kensington, W.:
November, 1900.

CATALOGUE OF THE LEPIDOPTERA OF IRELAND: SUPPLEMENTARY LIST.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

RHOPALOCERA.

Pieris rapæ, *L.*, var. metra, *Steph.*—A male taken at Clogher Head, Co. Louth, by Mr. Thornhill, in June.

P. napi, *L.*, ab. flava, *Kane.*—A very deeply coloured example of this was taken at Magilligan, Co. Derry, by the late Mr. Curzon.

P. daplidice, *L.*—One captured, Aug. 18th, 1893, by Mr. Hind, at Courtown, Co. Wexford. A correspondent at Ferns also reports its occurrence there, but I have not seen the specimens.

Leucophasia sinapis, *L.*—Curraghmore, Co. Waterford (*Rev. W. F. Flemyng*); five miles west of Kildare (*Mr. Freke*); Mount Congreve, Tramore, and near the town of Waterford, and at Milepost, Co. Kilkenny (*Buonaparte Wyse*); Merlin Park, Galway, abundant.

Colias edusa, *Fb.*—Occasional immigrations of this butterfly have been recorded during the last few years, chiefly in the South of Ireland, and numerously in 1899; one or two also in the northern half of the island.

GONOPTERYX RHAMNI, *L.*—Broadford, Scariff (Ir. Nat. vii. 58), and Cratloe, Co. Clare (*F. Neale*). Also at Dalyston, near Loughrea, and Gort, Co. Galway (*R. E. D.*); Ballinrobe, and shore of L. Mask.

MELITÆA AURINIA, *Rott.*—This species seems to be very universally though locally distributed throughout Ireland. The following are some additional localities:—Milepost, Co. Kilkenny; Timoleague and Berehaven, Co. Cork; Birr, King's Co.; Merlin Park, Galway; Portlaw, Co. Waterford; Dalyston, near Loughrea.

VANESSA IO, *L.*—In 1900 not rare in many places in Ulster, as at Armagh, Derry, Donegal, Drumreaske, Newry, and Tyrone.

EREBIA EPIPHRON, var. CASSIOPE, *Fb.*—Since writing my notice of this butterfly, and suggesting that the mountain range from Achill to Nephin might very probably yield habitats, I have been fortunate enough to meet with a few specimens on Nephin. The bad weather and subsequent engagements have prevented my investigating the locality further. One specimen, in a collection of the Rev. R. McClean, is believed to have been taken on the hilly slopes on the eastern shores of L. Gill, Sligo.

CŒNONYMPHA TYPHON, *Rott.*—Very dark forms about Clonbrock.

THECLA QUERCUS, *L.*—Cratloe, near Limerick (*F. N.*), Killarney, Timoleague, Co. Cork (*D.*); Killoughrim Wood, Enniscorthy (*M.*); Enniskillen, scarce (*P.*); Dalyston, Co. Galway (*R. E. D.*); Portlaw, Co. Waterford.

LYCÆNA ARGIOLUS, *L.*—Curraghmore, Co. Waterford, abundant (*B. Wyse*).

SYRICHTHUS MALVÆ, *L.*—Two taken at the copper mines, Killarney (*W. Salvage*),

NISONIADES TAGES, *L.*—Killarney (Mucross demesne), Enniscorthy (*M.*); abundant throughout the Burren, and the stony limestone pastures of Clare, from Dromoland, Kilfenora to Ballyvaughan.

HETEROCERA.

ACHERONTIA ATROPOS, *L.*—It would serve no purpose to chronicle the localities in which, in suitable years, this migrant or *Sphinx convolvuli* has been noticed. Being such strong fliers, the immigrants disperse themselves over every part of the island, sometimes in considerable numbers.

DEILEPHILA LIVORNICA, *Esp.*—One at Trim, in 1894, by Mrs. Cuppage; one at Howth (*G. V. H.*).

SMERINTHUS OCELLATUS, *L.*—Timoleague (*R. Donovan*), and Mallow (*Stawell*), Co. Cork; numerous at L. Iron, Westmeath; and locally at Enniskillen (*P.*).

S. TILIÆ, *L.*—One at Killarney, reported by W. Salvage.

MACROGLOSSA BOMBYLIFORMIS, *Esp.* — (The narrow-bordered bee-hawk). By an oversight Ochsenheimer's species appears in the Catalogue. It is referable to the above. Further localities are Clonbrock, Athenry, and Merlin Park, Galway; Mote Park, Roscommon; Cratloe Wood, near Limerick (*Neale*); Mallow (*Stawell*); Curraghmore, Waterford (*B. Wyse.*).

TROCHILIUM CRABRONIFORMIS, *Lewin.* — Castle Bellingham, Clonbrock, Enniskillen, and Tempo.

SESIA SCOLIIFORMIS, *Rott.* — Since writing a notice of this species I have taken three imagines at Killarney, as well as the larvæ both there and near Kenmare. A *Pimpla* bred from one of the latter, Mr. Bignell states (*in litt.*), is a new British species of ichneumon not in Marshall's list. *Pimpla examinator* he had received from Gregson, out of the same host.

S. MYOPIFORMIS, *Bork.*—Clonbrock; Killarney (*W. Salvage*). I have found the larvæ and empty pupal cases of this or the following species in cherry-trees at Drumreaske, Monaghan. Its ravages produce serious damage in the stems, which swell out where bored into unsightly excrescences exuding gum.

SESIA CULICIFORMIS, *L.*—Two imagines taken at Clonbrock by Mr. Dillon.

S. MUSCIFORMIS, *View.*—Reported by Dr. Greene from near Ferns, Co. Wexford.

ZYGÆNA PILOSELLÆ, *Esp.*—On the Galway shore of L. Derg, a few (*Gleeson*), Ir. N. viii. 250. I have met with it over a wide extent of the Co. Clare, especially in Burren, and as far south as Dromoland. A unique variety, with yellow under wings, was taken by Mr. Allen near Galway.

(Z. TRIFOLII, *Esp.*—I am, on further examination of the question, inclined to delete this species from the Irish list. The few specimens relied on (since Mr. More's record at Castle Taylor) are worn and doubtful, and, having gained a considerable further experience of the Irish lepidopterous fauna, I am unable to substantiate with certainty the earlier records, which I believe must be referred to the following species.)

Z. LONICERÆ, *Esp.* — Roundstone, Connemara (*Walker*); Portora, near Enniskillen, abundant (*A.*); Dungannon (*T. Greer*); Clonbrock (*R. E. D.*); Belleisle, near Lisbellaw.

NOLA CONFUSALIS, *H.-S.*—Clonbrock; Timoleague, Co. Cork (*R. D.*); Enniskillen (*P.*).

NUDARIA SENEX, *Hb.*—One specimen taken by Col. Partridge near Enniskillen.

SETINA IRRORELLA. (*Clerck*). — Ardrahan, Co. Galway, and west through the Burren of Clare, widely spread.

LITHOSIA LURIDEOLA, *Zinck.*—Castle Bellingham and Clogher Head, not rare; Athlone (*Wilcox*).

GNOPHRIA QUADRA, *L.* — Killarney; Timoleague, Co. Cork (*R. D.*); Curraghmore, abundant (*Rev. W. Flemyng*), and Lismore (*Neale*) Co. Waterford; Borris, Co. Carlow (*Freke*), and Clonbrock (*R. E. D.*).

G. RUBRICOLLIS, *L.* — Berehaven, Co. Cork (*Carpenter*), and Timoleague; Sligo (*McC.*); Belleisle, near Lisbellaw, Clonbrock (*R. E. D.*).

NEMEOPHILA RUSSULA, *L.*—Kenmare neighbourhood; Cappagh, and near Waterford (*B. Wyse*); Milepost, Co. Kilkenny (*B. Wyse*); Cratloe, near Limerick (*Neale*).

SPILOSOMA MENDICA *Clerck.*—A specimen of the dark typical male has been taken by the Hon. E. O'Brien at Dromoland, Co. Clare. One has already been recorded from Clonbrock in the adjoining county.

Var. RUSTICA, *Hb.*—This has latterly been taken in some fresh localities: Parsonstown, King's Co. (*Hon. G. Parsons*); Killarney; Lucan (*Halbert*), a very white male; Timoleague, Co. Cork, a similar one (*R. D.*).

S. URTICÆ, *Esp.*—One at Clonbrock (*R. E. D.*), May 16th, 1896, in a moth-trap.

HEPIALUS LUPULINUS *L.*—Pontoon on L. Conn, Mayo; Bragan, Co. Monaghan. Var. *fuscus*, Kenmare, Ir. N. vii. 210.

COSSUS LIGNIPERDA, *Fb.*—Between Baltinglass and Dunlavin, Co. Wicklow; abundant at Maganey, Co. Kildare (*Carpenter*).

MACROGASTER CASTANEÆ, *Hb.*—No further capture of this insect in Ireland can be chronicled, and on examination of Lough-a-Callow, the locality in question, I can find no trace of *Phragmites communis*.

LEUCOMA SALICIS, L.—Abundant about Lough Doon, Mullingar (*Middleton*).

DASYCHIRA FASCELINA, *L.*—Tullamore (*Halbert*).

TRICHIURA CRATÆGI, *L.* — A blackish form was taken at Magilligan, near Derry, by W. Salvage. Its larvæ were feeding on blackthorn.

BOMBYX NEUSTRIA, *L.*—Dungarvan, and various localities in the south and south-west. Enniskillen, rare (*P.*); one at Galway (*A.*).

DREPANA FALCATARIA, *L.*—Enniskillen (*A.*).

Dicranura furcula, *L.*—Drumreaske and Altadiawan, Co. Tyrone. Very abundant at Clonbrock.

D. bifida, *Hb.*—Oughterard, one larva reported. Fairly numerous at Clonbrock.

Stauropus fagi, *L.*—Taken again at Ardtully, Kenmare, by myself. One very dark specimen at Clonbrock, and one at Merlin Park, Galway (*R. E. D.*). Larvæ reported from Belleisle, Up. L. Erne.

Ptilodontis palpina, *L.*—Drumreaske; Tempo, near Enniskillen, Enniskillen (*P.*); Clonbrock, a few (*R. E. D.*); Sligo (*McC.*).

Notodonta dictæoides, *Esp.*—Howth (*G. V. H.*), and Clonbrock.

N. dromedarius, *L.*—Var. *perfusca* at Tempo (*Langham*).

N. chaonia, *Hb.*—Has occurred in considerable numbers at Clonbrock, when a moth-trap was placed in a ruin at some fifty or sixty feet from the ground. Two at Mallow, Co. Cork, by Mr. Millbank.

Cymatophora or, *Fb.*—Mr. Campbell's record from Derry must be deleted, the specimen turns out to be *Asphalia flavicornis.* Enniskillen (*Capt. Brown*); one at Clonbrock, of the ordinary English type, and at Pontoon on L. Conn, Mayo, I took a considerable series of fine specimens with dull ground colour shaded with brownish bands, but not showing any rosy tinge.

C. duplaris, *L.*—Further investigations assure me that this species is almost universally distributed through Ireland.

C. fluctuosa, *Hb.*—Ardtully, near Kenmare, not very rare.

Asphalia flavicornis, *L.*—Derry (*C.*), Enniskillen (*P.*), Clonbrock (*R. E. D.*); single specimens only, except at Enniskillen, where the larvæ only were taken.

Acronycta tridens, *Schiff.*—One larva was found at Enniskillen by Col. Partridge.

A. leporina, *L.*—Cratloe Wood, near Limerick, and near Kenmare; Howth (*M. F.*).

A. aceris, *L.*—Enniskillen (*P.*); Timoleague, Co. Cork (*R. D.*).

A. megacephala, *Fb.*—Castle Bellingham, Co. Louth.

A. menyanthidis, *View.*—Clonbrock, one (*R. E. D.*), Parsonstown, King's Co. (*Hon. G. Parsons*). I found the larvæ near Recess, Connemara, very numerously, feeding on *Myrica gale*, and rarely on *Menyanthes trifoliata.*

A. euphorbiæ var. montivaga, *Gn.*—Dursey Island, a locality very similar to Galley Head, Co. Cork; Killarney, and Kenmare; Pontoon, Co. Mayo; Dalyston, near Loughrea, and Clonbrock (*R. E. D.*).

DILOBA CÆRULEOCEPHALA, *L.* — Trim, Co. Meath (*Mrs. Cuppage*).

LEUCANIA TURCA, *L.*—Mr. Dillon reports having captured one at Clonbrock; and two at Merlin Park, Galway.

L. UNIPUNCTA, *Haw.* (EXTRANEA, *Gn.*).—One specimen at sugar, September 13th, 1896, taken by Mr. R. Donovan at Timoleague, Co. Cork. It is small, pale in colour, but a well-marked example (Ir. Nat. vi. 104).

L. LITTORALIS, *Curt.*—Dingle, and abundant on the sandhills of Tralee Bay, Kerry; as at Castle Gregory, where I took two examples with a red suffusion bordering the central white stripe of the fore wings.

L. STRAMINEA, *Tr.*—Dromoland, Co. Clare (*Hon. E. O'Brien*).

CŒNOBIA RUFA, *Haw.*—Two at Clonbrock (*R. E. D.*).

NONAGRIA (CALAMIA) LUTOSA, *Hb.*—Lough Erne, Belleisle, and Enniskillen.

GORTYNA OCHRACEA, *Hb.*—Dromoland, Co. Clare (*Hon. E. O'Brien*).

XYLOPHASIA SUBLUSTRIS, *Esp.*—Enniskillen (*A.*); Trim, Co. Meath, a dingy brownish form, not ruddy as the type (*G. V. H.*).

LAPHYGMA EXIGUA, *Hb.*—Mr. R. Donovan has added another rarity to the Irish list. He captured a very fine example of this species on September 8th, 1899, on honeydew on a lime tree at Timoleague, Co. Cork.

LUPERINA CESPITIS, *Fb.*—Trim, Co. Meath (*Mrs. Cuppage*); Enniskillen (*P.*); Cappagh, Co. Waterford (*B. Wyse*); Timoleague, Co. Cork (*R. D.*); Clonbrock.

MAMESTRA ABJECTA, *Hb.*—Since publishing, Mr. Thornhill, of Castle Bellingham, Co. Louth, has taken specimens of this moth on the adjoining coast.

M. SORDIDA, *Bork.*—One at Howth (*M. F.*).

M. ALBICOLON, *Hb.*—Rossbeigh, and Castle Gregory, Kerry.

M. FURVA, *Hb.*—Bundoran, Co. Donegal (*J.*); Magilligan, near Derry, several (*W. Salvage*).

APAMEA OPHIOGRAMMA, *Esp.*—Enniskillen (*P.*).

MIANA BICOLORIA, *Vill.*—Timoleague, Co. Cork (*R. D.*). Mr. Campbell writes that he has recorded this species from near Derry in error.

(To be continued.)

ON THE MORPHOLOGY AND CLASSIFICATION OF THE AUCHENORRHYNCHOUS HOMOPTERA.

By Dr. H. J. Hansen.

(Continued from p. 172.)

C. *Legs.*

These are best discussed when the coxæ, trochanters, and femora are considered together, and the tarsi separately by themselves; of the tibiæ, I have nothing new to say here. In connection with the posterior coxæ, I mention the ventral part of the third thoracic segment; this part is termed the *metasternum*, which is scarcely correct, but I have not been able to distinguish between sternum, epimera, and episterna, and therefore call attention to an observation by Schjodte in his celebrated work:* "Cryptocerata [in the Heteroptera] have undivided thoracic segments, like all other Rhynchota. A re-examination will certainly give the result that a veritable suture between sternum and epimera will in no case be found."

1. *Coxæ, Trochanters, and Femora.*

As regards the coxæ, authors have hitherto been content usually to describe their extension in breadth and length; but attention should also be directed to matters fully as important (as Schjodte has pointed out), *viz.* the movements they are able to perform in consequence of the form, and according to the quality of their articulation. The anterior legs present such strong agreement among all the families that they can be discussed under a single heading, but the other two pairs must be considered in each family separately.

a. Anterior Legs.

The coxæ are sometimes of considerable length, proportionately to their thickness or breadth (*Stridulantia*, *Fulgora*), sometimes tolerably short and broad (*Tettigometra*, *Aethalion*), scarcely, however, ever shorter than broad; but whatever their shape may be they are attached to the body only by their oblique basal part, so that an always considerable distal portion is entirely free; and, in the next place, they are always articulated more or less towards the sides of the prothorax, with the interior angles of their articulation *at least a very considerable space from the insect's middle plane*, and they are then directed backwards and inwards against the middle plane. The trochantins (pl. ii.

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* "Nogle nye Hovedsætninger af Rhynchoternes Morphologi og Systematik" (Naturh. Tidskr. (3), vi. pp. 237–66, 1869), translated into English in 1870, Ann. Mag. Nat. Hist. (4), vi. pp. 225–49.—G. W. K.

f. 6 a) are very distinct on the anterior side of the basal portion. The articulating membrane is, with the exception of the spot on the proximal point of the coxæ, well developed, and is remarkably broad on the inner side of the articulation. Consequent on this articulation, the coxæ can perform two kinds of movements: in part they can turn on an axis, which forms a very acute angle with their own long axis, and with this turning the apices of the femora move in a part of a semicircle from behind forwards and inwards (and *vice versâ*); in part this distal portion is able to move, on turning around on an axis perpendicular to the longitudinal direction of the coxæ, somewhat backward and inward, somewhat forward and outward, (*adduction* and *abduction*), whence it follows that the tarsi are able to extend farthest outwardly, forward or behind, when the coxæ are "abduced."

In the *Stridulantia* the anterior femora are very thick, and generally toothed beneath; the trochanters are thick, supporting (*viz.* connected with) the femora by a very oblique articulation, which presents a very well developed see-saw movement. In the other three families the anterior femora are usually not very thick, and unarmed. Trochanters supporting, normal; only in *Darnis* have I found both anterior (and intermediate) femora strongly dilated.

b. Intermediate Legs. 1. *Stridulantia.*

The coxæ are moderately short, broad, and obliquely triangular at the base, with an articulation which is quite as long as the coxæ, and *the interior angle of the articulation is situated moderately near to the insect's middle plane.* The coxæ are sometimes *in the middle plane* contiguous at their moderately short, free, distal part; this is often, however, not the case, for in *Platypleura* the distance between them is somewhat considerable. The principal movement is rotary, to and fro on an axis from *the exterior angle of the articulation to its antero-interior angle,* almost perpendicular to the insect's longitudinal axis; moreover, a rather feeble adduction and abduction is possible, arising from the fact that the articulating membrane along the interior margin of the articulation is rather broad. A real "meracanthus" is not to be found, but the plate situated on the postero-exterior margin of the coxæ, from which it otherwise originates, is here well developed. The trochanters are supporting, and the femora normal as in the three families following:—

2 and 3. *Cercopidæ* and *Jassidæ.*—The coxæ have a form somewhat resembling that in the *Stridulantia;* they are, however, quite as transversely situated and placed close together, *so that their free apical parts are contiguous in the middle plane; their ad- and abductorial movements are only feeble.* A meracanthus is very considerable, and strong in all Cercopidæ; it is wanting in most Jassidæ, but is, however, strong, long, and broad at the

base in Hoplophorinæ (see Stål in 'Hemiptera Africana'), and I have also found it in a less strongly marked form in many other genera. For instance, it is shorter but broad at the base in some (all ?) species of *Darnis;* in *Epiclines planata*, F., and *Petalocera bohemanni*, Stål, it is very long, but narrow; in *Proranus adspersipennis*, Stål, it is short; and in *Ledra aurita*, L., one can find no trace of it.

4. *Fulgoridæ.*—The intermediate coxæ are here, contrary to the foregoing families, formed and articulated like the anterior coxæ. In, for instance, *Fulgora*, they have a very important length (are something more than twice as long as broad), their rather short articulation is situated at *a good distance from the middle plane* towards the lateral margins of the body, and from this point their free good-sized distal part is directed inwards and backwards, where they, at the articulation of the trochanters, are almost contiguous at the middle plane. Trochantins are very distinct; the articulating membrane at the anterior angle of the articulation is considerable. A similar structure is found in most Fulgoridæ. In *Tettigometra* (pl. ii. f. 6) the coxæ are short, very broad towards the base, and the articulation is very long; but the interior angle of the coxa, which is connected with the articulating membrane, is nevertheless somewhat remote from that of the opposed coxa.

One may thus sum up the characteristics of this family, *viz.* that the intermediate coxæ have the *interior angle of their articulation importantly remote from the middle plane;* and, singularly, *that their movements, like those of the anterior coxæ, are strongly marked double-acting*, viz. *rotation and important ad- and abduction; Tettigometra* itself, which certainly most evidently points towards the Jassidæ, has, however, preserved the most characteristically Fulgorid trait in the form and situation of the articulation. A meracanthus is usually wanting; in *Aphana farinosa*, Weber, *Odontoptera spectabilis*, Carreno, and many forms, I have, however, found one, which is then short, or at least fairly short, sticking out near the exterior angle of the coxa.

c. *Posterior Legs.* 1. *Stridulantia.*

The metasternum is *entirely firmly chitinised*, is often short in the middle, but has also occasionally a very considerable longitudinal extension. The coxæ have the simplest form within the Auchenorrhyncha; they are of the size of, or a little larger than, the intermediate coxæ, and with a slightly longer articulation than the latter; they are basally contiguous in the middle plane, and, as they are not remarkably large, there is (as Stål has indicated) a *considerable distance between their exterior angles and the lateral margins of the metathorax.* On account of the quality of their articulation, especially the feeble development of the articulating membrane at the interior angles of their attachment, they are *only* able to turn to and fro on an axis from the outer to the inner angles of the cotyla. The trochantins are well developed, long and moderately slender. A meracanthus is strongly developed in some forms, feeble or wanting in others. The trochanters are supporting, but however the articulations are, between them and the femora, almost perpendicular to the longitudinal axis of the latter, and present very strongly developed see-saw movements; the trochanters, moreover, are not broader than the femora, which are moderately slender and of normal appearance.

2. *Cercopidæ.*—The metasternum always has a considerable, sometimes (*Philænus*) a very considerable, breadth (perhaps, one should say, a greater length, as the extension which shall be indicated is in the longitudinal dimension of the insect); along the middle line one finds a strip, which widens anteriorly behind the mesosternum to a plate, which is strongly chitinised, and on each side of this solid middle strip one finds a *very considerable membranous part*, which extends along the anterior margin of the posterior coxæ almost to their exterior angles, and proceeds thence more or less forward, and towards the lateral margin of the insect. *The posterior coxæ do not possess apparently broader articulation than the intermediate coxæ*, and as regards this are similar to the Stridulantia; but the attachments are—as the parts along almost the entire anterior margin of the coxæ are membranous—of another quality, and the true, more substantial articulation between the coxæ and thorax is found therefore along the peculiarly formed *exterior margin* of the coxæ, and at its lower interior angles situated at the base of the abdomen. *The movements are well developed, see-saw-like, as in Stridulantia.* The interior margins of the two coxæ are contiguous along the middle line; their free part extends backwards over the base of the abdomen, and is proportionately longer than in the preceding and following families. There is no meracanthus. The trochanters have a somewhat varying form, and are somewhat broader than the basal part of the femora (f. 5 b); the articulation between the trochanter and femur is not very oblique, and the segmental membrane is rather broad at the side facing the middle plane; so that the movements are more extensive than in the Stridulantia and Jassidæ. The femora are a little thinner at their base than a little way from it, and *on the side facing the abdomen is found, a little from its base, a good-sized oblique protuberance* (f. 5 d), the significance of which I do not comprehend; *but as it occurs in all the Cercopidæ I have examined* (even in *Machærota*), *and not in any other Auchenorrhyncha known to me*, it is probably a reliable family character. The protuberance and its environs have a peculiar scaly-like sculpturing; its interior is filled with a mass looking like connective tissue.

(To be continued.)

BRITISH DRAGONFLIES OF THE OLDER ENGLISH AUTHORS.

By W. J. Lucas, B.A., F.E.S.

(Concluded from p. 299.)

8. *Dr. H. A. Hagen*: '*A Synopsis of the British Dragonflies*,' in the 'Entomologist's Annual,' 1857.

In this article Dr. Hagen has described shortly, and given a few notes on, all the species of British Dragonflies, and, in addition, has similarly treated the European species most likely to be found in this country. The list is nearly the same as that at present received; but six doubtful species, or extremely casual ones are included. The nomenclature also does not greatly differ from that at present recognised. The British species are as follow:—

1. **Libellula quadrimaculata** = *Libellula quadrimaculata.*
2. **L. depressa** = *L. depressa.*
3. **L. fulva** = *L. fulva.*
4. **L. cancellata** = *Orthetrum cancellatum.*
5. **L. cærulescens** = *O. cærulescens.*
6. **L. flaveola** = *Sympetrum flaveolum.*
7. **L. Fonscolombis** = *S. fonscolombii.*
8. **L. meridionalis** = *S. meridionale.*
9. **L. striolata** = *S. striolatum.*
10. **L. vulgata** = *S. vulgatum.*
11. **L. sanguinea** = *S. sanguineum.*
12. **L. Scotica** = *S. scoticum.*
13. **L. dubia** = *Leucorrhinia dubia.*
14. ? **Cordulia metallica** = *Somatochlora metallica.*
15. **C. arctica** = *S. arctica.*
16. **C. ænea** = *Cordulia ænea.*
17. **C. Curtisii** = *Oxygastra curtisii.*
18. **Gomphus vulgatissimus** = *Gomphus vulgatissimus.*
19. **G. flavipes** = *G. flavipes.*
20. **G. forcipatus** = *Lindenia forcipata.*
21. **Cordulegaster annulatus** = *Cordulegaster annulatus.*
22. **Æschnia pratensis** = *Brachytron pratense.*
23. **Æ. mixta** = *Æschna mixta.*
24. **Æ. borealis** = *Æ. cærulea.*
25. **Æ. juncea** = *Æ. juncea.*
26. **Æ. cyanea** = *Æ. cyanea.*
27. **Æ. grandis** = *Æ. grandis.*
28. **Æ. rufescens** = *Æ. isosceles.*
29. **Anax formosus** = *Anax imperator.*
30. **Calopteryx Virgo** = *Calopteryx virgo.*
31. **C. splendens** = *C. splendens.*
32. **Platycnemis pennipes** = *Platycnemis pennipes.*

33. **Lestes viridis** = *Lestes viridis.*
34. **L. nympha** = *L. dryas.*
35. **L. sponsa** = *L. sponsa.*
36. **L. virens** = *L. virens.*
37. **L. barbara** = *L. barbara.*
38. **Agrion Najas** = *Erythromma naias.*
39. **A. minium** = *Pyrrhosoma nymphula.*
40. **A. tenellum** = *P. tenellum.*
41. **A. Pumilio** = *Ischnura pumilio.*
42. **A. elegans** = *I. elegans.*
43. **A. pulchellum** = *Agrion pulchellum.*
44. **A. puella** = *A. puella.*
45. **A. mercuriale** = *A. mercuriale.*
46. **A. cyathigerum** = *Enallagma cyathigerum.*

In 1870 appeared 'A Catalogue of the British Neuroptera,' by R. McLachlan, published by the Entomological Society of London, and the list of works on exclusively British Odonata closes with the writer's 'British Dragonflies,' published in the present year. Omitting doubtful species, and casuals that have not occurred since long ago, the British list is as follows, McLachlan's names where they differ being given in brackets:—

1. *Leucorrhinia dubia ;* 2. *Sympetrum striolatum ;* 3. *S. vulgatum ;* 4. *S. fonscolombii* ;* 5. *S. flaveolum* † ; 6. *S. sanguineum ;* 7. *S. scoticum ;* 8. *Libellula depressa* (*Platetrum depressum*) ; 9. *L. quadrimaculata ;* 10. *L. fulva ;* 11. *Orthetrum cærulescens ;* 12. *O. cancellatum ;* 13. *Somatochlora metallica* ‡ *;* 14. *S. arctica* (*Cordulia arctica*) ; 15. *Cordulia ænea ;* 16. *Oxygastra curtisii* (*Cordulia Curtisii*) ; 17. *Gomphus vulgatissimus ;* 18. *Cordulegaster annulatus ;* 19. *Anax imperator* (*A. formosus*) ; 20. *Brachytron pratense ;* 21. *Æschna mixta ;* 22. *Æ. cærulea* (*Æ. borealis*) ; 23. *Æ. juncea ;* 24. *Æ. cyanea ;* 25. *Æ. grandis ;* 26. *Æ. isosceles* (*Æ. rufescens*) ; 27. *Calopteryx virgo ;* 28. *C. splendens ;* 29. *Lestes dryas* (*L. nympha*) ; 30. *L. sponsa ;* 31. *Platycnemis pennipes ;* 32. *Erythromma naias ;* 33. *Pyrrhosoma nymphula* (*P. minium*) ; 34. *P. tenellum ;* 35. *Ischnura pumilio ;* 36. *I. elegans ;* 37. *Agrion pulchellum ;* 38. *A. puella ;* 39. *A. hastulatum* § ; 40. *A. mercuriale ;* 41. *Enallagma cyathigerum* (*Agrion cyathigerum*).

* A casual only.
† Perhaps a migrant only.
‡ Absent from McLachlan's list.
§ Discovered in Scotland during the past summer.

SYNOPSIS OF EXPERIMENTS IN HYBRIDIZATION AND TEMPERATURE MADE WITH LEPIDOPTERA UP TO THE END OF 1898.*

By Prof. Dr. Max Standfuss.

Plates III. & IV. (Entom. Plates VII. & VIII.).

(Continued from p. 292.)

Second, Crossing, and Hybridization Experiments.

The increase in numbers of species is caused by the splitting up of a group of individuals which originally lay within the limits of a single species, the separated forms becoming more and more divergent till quite isolated. This is a generally accepted theory of zoology.

If we name the groups of individuals which are diverging A and B, this isolation manifests itself through the fact that neither A ♂ crossed with B ♀ nor B ♂ with A ♀ are capable of producing offspring which are sufficiently fertile to remain as an independent form, even for a—phylogenetically speaking—limited period.

This isolation must be regarded as the final result of a continued increasing physiological divergence and difference, and we must accept this as the cause of creation of species for all geological periods of our earthly fauna and flora.

If this theory is correct, the artificial crossing experiments will indicate the present state of the physiological divergence and difference of the creatures and plants experimented with. The following hybridization experiments with Lepidoptera—which, by the way, are very difficult—were undertaken with this idea, and with this end in view; and to me it appears that none of the results obtained reduce this theory *ad absurdum*, but, on the other hand, prove its validity.

Of the numerous hybridization experiments made during the years 1873–1894, many had a constantly sterile result, in spite of frequent repetition.

Nine different crossings of genuine species were fertile:—

1. *Smerinthus ocellata*, L., ♂ × *populi*, L., ♀.
2. *Zygæna trifolii*, L., ♂ × *filipendulæ*, L., ♀.
3. *Bombyx franconica*, Esp., ♂ × *castrensis* var. *veneta*, Stdfs., ♀.
4. *B. castrensis* var. *veneta*, Stdfs., ♂ × *franconica*, Esp., ♀.
5. *B. neustria*, L., ♂ × *franconica*, Esp., ♀.
6. *B. neustria*, L., ♂ × *castrensis* var. *veneta*, Stdfs., ♀.
7. *Saturnia pavonia*, L., ♂ × *Actias isabellæ*, Grælls, ♀.
8. *S. pavonia*, L., ♂ × *spini*, Schiff., ♀.
9. *S. pavonia*, L., ♂ × *pyri*, Schiff., ♀.

Nos. 4 and 7 of these nine crossings only produced a small number of larvæ, which were not successfully reared. From the remaining seven crossings imagines were bred. One (No. 5) only produced a few males, and two others (Nos. 3 and 6) only a few females, the latter always having the organs of reproduction undeveloped. No. 1 produced male imagines in numbers, but only a very few crippled females. Three crossings (Nos. 2, 8, and 9) produced males and females in normal proportions, but only one of these crossings (No. 2) produced females with the ovaries properly filled with eggs; the females of the other two crossings (8 and 9) possessed no germs, except a few females of No 8, which quite exceptionally had a few crippled and malformed ones.

The fundamental law to be drawn from these experiments, as indicative of the character of hybrids, is as follows:—

Primary hybrids—that is, the result of crossing genuine species drawn from nature—generally produce an individual (in most cases an intermediate form between the two parent species) which is relatively nearer to the phylogenetic older species than the newer. The older species enforces its biological, morphological, and physiological characters on its hybrid offspring to a greater degree than the younger. This law was proved in the following manner:—

The highly interesting fact was observed that the male of the small emperor (*S. pavonia*) had very little influence on a brood of eggs obtained by crossing it with a female *S. spini*, which is not much bigger than the small emperor; whereas the male *S. pavonia* had a great influence on the brood of the large *S. pyri*, which is about eleven times as big. Why does this same creature (*S. pavonia* ♂) so largely alter by crossing the brood of the giant *S. pyri*, when it has so little influence on that of *S. spini*, which is about as large as itself?

A comparison of the larval and pupal stages of the three species—*S. spini*, *pavonia*, and *pyri*—showed in several regards three different grades of protective resemblance respecting certain inimical factors of nature. On this genealogical tree *spini* always took the lowest place, *pyri* always the highest. On account of the extraordinarily close relationship, and the great similarity of the biological conditions of the three species, we are forced to the conclusion that *spini* is the phylogenetic oldest; *pavonia*, younger; and *pyri* the phylogenetic youngest form. (Further particulars can be obtained: Standfuss, Handbuch, 1896, pp. 100–107.) Applying this conclusion to the results of the crossing experiments: the oldest species (*spini*) was able to cling to its characters more strongly than the younger *pavonia*, and this latter again more strongly than the still younger *pyri*. A long genetic past thus strengthens specific characters.

A very striking example of this law is exhibited by the hybrid of *Deilephila euphorbiæ* ♂ × *D. vespertilio* ♀. All the individuals of this crossing which I have yet seen—about fifty specimens—are so near to *D. euphorbiæ* that one would suppose that they were an ill-characterized variation of the latter species, if its hybrid extraction were not known. The type of *D. euphorbiæ* is distributed over nearly the whole world in numerous species, and is therefore almost certainly the relatively older; whereas *D. vespertilio* is a solitary type of eccentric character, occurring over a very limited area, and therefore most probably newly formed. The reciprocal hybrids of *Smerinthus ocellata* × *S. populi* (both forms are known) illustrate the law in question very thoroughly. We have good grounds for believing that the type of *S. populi* is older than *S. ocellata.* The highly differentiated eye-markings on the hind wing indicate this fact very strongly.

The cross between *S. ocellata* ♂ × *populi* ♀ is in colour and markings nearer to *S. populi* than *ocellata*, and the reciprocal cross *S. populi* ♂ and *ocellata* ♀ exhibited among the specimens hitherto seen by me, even a specimen which could not be distinguished from the very variable *populi.*

Besides the evident predominance of the phylogenetically more ancient *populi* type on the part of the hybrids, this crossing showed another or second law very thoroughly, namely, that the male sex has a far greater influence on the resulting hybrids than the female.

In the reciprocal crosses between *Saturnia pavonia*, L., × *spini*, Schiff., of which *S. spini*, Schiff., is the more ancient type, the case was the same; the male element had more influence on the resulting form of the hybrid than the female (see Handbuch, 1896, pp. 66–76). The same fact has been noted by C. Oberthür in the third and last reciprocal hybrid as yet known (bred by O. Hüni-Inauen, Zürich); *Biston hirtarius*, Cl. × *pomonarius*, Hb., hybr. *pilzii*, Stdf., from a pairing of *hirtarius*, Cl., ♂ × *pomonarius*, Hb. ♀ (see Handbuch, 1896, pl. iii. figs. 1 and 2; and Oberth. Bullet. de la Soc. Entom. de France, 1897, No. 15, pp. 256–259, and pl. 1); hybr. *hünii*, Oberth., from *pomonarius* ♂ × *hirtarius*, ♀ (see Bullet. de la Soc. Entom. de France, 1897, No. 15, pl. 2).

Of the reciprocal crossing of two local races of the same species, of which the author bred many examples, viz.:—

1. *Callimorpha dominula* ♂ × *dominula* var. *persona*, Hb., ♀.
2. *C. dominula* var. *persona*, Hb., ♂ × *dominula*, L., ♀.
3. *Spilosoma mendica*, Cl., ♂ × *mendica* var. *rustica*, Hb., ♀.
4. *S. mendica* var. *rustica*, Hb., ♂ × *mendica*, Cl., ♀ —

the reciprocal mixtures of *C. dominula*, L., and its var. *persona*, Hb., fell under this law, but the reciprocal mixtures of the small ermine (*S. mendica* and its var. *rustica*, Hb.) showed that the hereditary qualities of the female individual were apparently in some respects stronger than the male of the same form (see Handb. 1896, pp. 220–226, and Pl. IV. figs. 5–17, and Pl. V.).

The following is shortly the result of the experiments made by the author up to the end of 1894 :—

I. The biological character of the primary hybrids, as was very clearly proved in the habits of the *Saturnia* hybrids (see Handb. 1896, p. 83), is principally influenced by the special peculiarities of the phylogenetically older species.

II. The morphological character of these hybrids is determined by two factors.

The first and most important is the inclination of the offspring to follow the phylogenetic oldest form. As subordinate to this first law, the predominant influence of the male parent. (This, however, appears not always to be the rule.)

III. The physiological character in a sexual direction was shown by anatomical research to be as follows :—

The females of five of the hybrids obtained (a further sixth form yielded only males) possessed either none at all, or else very few degenerate egg-germs or eggs, and the latter have as yet never shown themselves capable of development.

All these hybrids were therefore, without doubt, incapable of reproduction.

Only the females of the seventh cross (*Zygæna trifolii*, Esp., ♂ × *filipendulæ*, L., ♀) constantly had in their ovaries a large number of apparently normally formed eggs, the powers of whose development have unhappily not yet been ascertained. The male hybrids, however, were no doubt all capable of reproduction ; this was indicated by an anatomical dissection of the reproductive organs of a number of them.

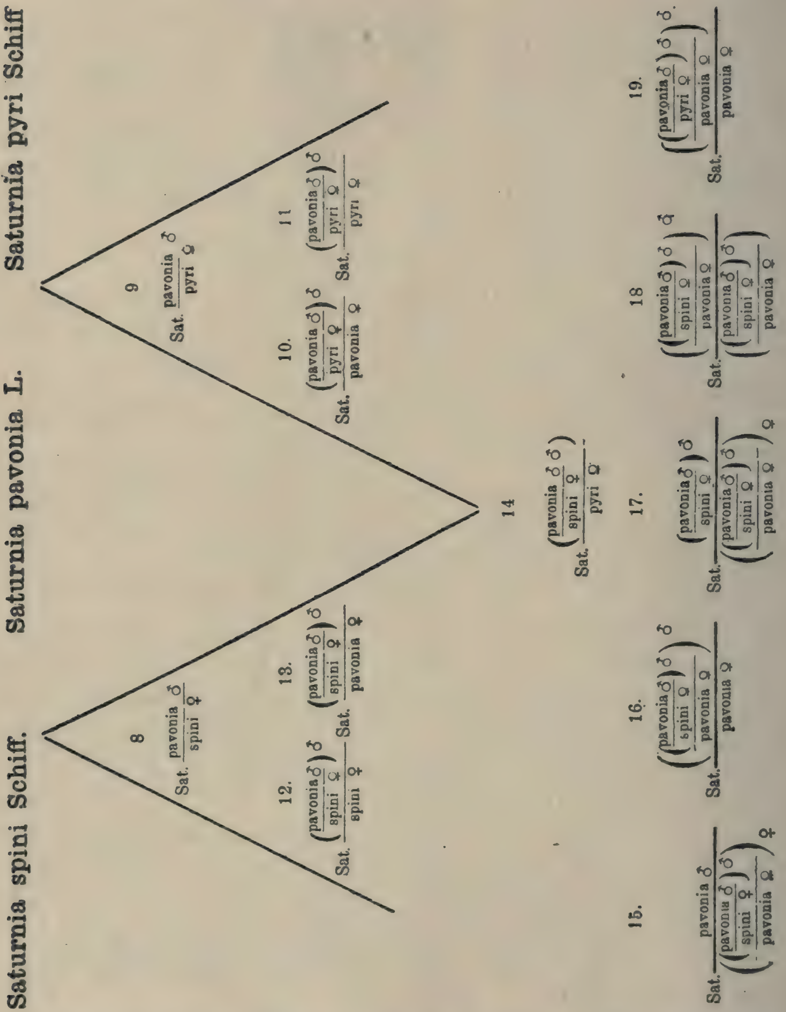
The experimental test of the reproductive capabilities of male hybrids, when crossed back with females of both parent forms, showed that the fertility of these primary hybrids was greater when paired with the phylogenetic older form than with the phylogenetic younger ; so that the physiological characters of the primary hybrid were nearer to the phylogenetic older form than the younger.

Further trials were made in the years 1895–7 in the direction of more thoroughly testing the characters of the various hybrid forms.

As previously, our three Central European Saturniids—*spini*, *pavonia*, and *pyri*, and their hybrids—were used.

The result is systematically shown on the accompanying plan. (See p. 344.)

As will be seen, not only the hybrid males of the crossing of *S. pavonia* ♂ × *spini* ♀ No. 8 (cfr. Handb. 1896, Pl. II. figs. 3, 4, 5), but also of the crossing of *S. pavonia* ♂ × *pyri* ♀ No. 9 (cfr. Handb. 1896, Pl. I. figs. 1–4) could be crossed back with the parent species, and imagines from all these four crossings


Saturnia spini Schiff.
Saturnia pavonia L.
Saturnia pyri Schiff
8 Sat. pavonia ♂ / spini ♀
9 Sat. pavonia ♂ / pyri ♀
10. Sat. (pavonia ♂ / pyri ♀) ♂ / pavonia ♀
11 Sat. (pavonia ♂ / pyri ♀) ♂ / pyri ♀
12. Sat. (pavonia ♂ / spini ♀) ♂ / spini ♀
13. Sat. (pavonia ♂ / spini ♀) ♂ / pavonia ♀
14 Sat. (pavonia ♂ ♂ / spini ♀) / pyri ♀
15. Sat. pavonia ♂ / (((pavonia ♂ / spini ♀) ♂ / pavonia ♀)) ♀
16. Sat. ((pavonia ♂ / spini ♀) ♂ / pavonia ♀) ♂ / pavonia ♀
17. Sat. (pavonia ♂ / spini ♀) ♂ / (((pavonia ♂ / spini ♀) ♂ / pavonia ♀)) ♀
18 Sat. ((pavonia ♂ / spini ♀) ♂ / pavonia ♀) ♂ / ((pavonia ♂ / spini ♀) ♂ / pavonia ♀)
19. Sat. ((pavonia ♂ / pyri ♀) ♂ / pavonia ♀) ♂ / pavonia ♀

Note.—In order to avoid a constant repetition of this complicated designation of the various hybrids, here, as before, they are numbered in order, and these numbers will be chiefly used in the text for their designation.

obtained. No. 10[1] (Pl. III. figs. 1, 2, 3, and Handb. 1896, Pl. II. figs. 6 and 7); No. 11 (Handb. 1896, Pl. IV. figs. 1, 2, 3);

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[1] The specimens figured (Pl. III. figs. 1, 2, 3) are from the same brood. They come from a large male of crossing No. 9 and a *S. pavonia* ♀ from Zürich. Only the gynandromorphic individual (fig. 3) developed to a large powerful insect; the male specimens (figs. 1 and 2) show the average size. Male specimens of this hybrid ranged in size between 66 and 73 mm.; gynandromorphic and female, from 75–87 mm.

No. 12[2] (Pl. III. figs. 4 and 5); No. 13[3] (Pl. VI. VII. VIII; also Exper. zool. Studien, 1898, Pl. V. fig. 6).

But moreover all three *Saturnia* species were combined for making up a hybrid—the male hybrid from the crossing of *S. pavonia* ♂ × *spini* ♀—that, is, No. 8 being crossed with a female of the third species, No. 14[4] (Pl. IV. figs. 1 and 2; also Exper. zool. Studien, 1898, Pl. V. figs. 7, 8, 9).

Even still more complicated hybrids were bred to the imago stage, No. 18[5] (Pl. IV. fig. 3), and No. 19[6] (Pl. IV. fig. 4); whereas from the hybrid crossings Nos. 15, 16, 17 only larvæ were obtained, which, though in part nearly full-grown, died of an infectious disease.

When large Dalmatian *S. pavonia* females (received from Zara through Spada) were used for this experiment instead of the much smaller Zürich form, the resulting hybrids measured—the males from 83 to 95 mm., gynandromorphic and females from 84 to 97 mm.

[2] The hybrid figured (Pl. III. figs. 4 and 5) resembles *S. spini* in structure and coloration. The male differs from *S. spini*, however, in the single coloured dark grey-brown hairs of the upper side of the abdomen, while the female possesses the broken transverse band at the base of the fore wings, which is a peculiarity of *S. pavonia.*

[3] The secondary hybrids (Pl. III. figs. 6, 7, 8) are also of one brood, from a strong hybrid male of No. 8 and a large Dalmatian *S. pavonia* ♀. Of this form (which I have named after the esteemed editor of our paper, Herrn Director, C. Schaufuss, *S.* hybr. *schaufussi*), two males (figs. 6 and 7) and a gynandromorphic specimen (No. 8) are figured.

[4] Of this highly interesting secondary hybrid of three species, which I have named *S.* hybr. *schlumbergeri*, in honour of Herrn Staatsrath Dr. J. von Schlumberger, of Gebweiler, a pair is figured (Pl. IV. figs. 1 and 2). The female gives one the impression of a very large gigantic *S. spini*. The male also inclines mostly to a large male of this type, without, however, entirely discarding its connection with *S. pavonia* and *pyri*. Two male pupæ of this rarity have already gone over three winters without developing, and will probably go through a fourth without emerging.

[5] I succeeded in rearing two males of the same brood of this crossing, the only pairing between true hybrid forms that I have yet obtained. One of these is shown (Pl. IV. fig. 3), and gives a very curious impression. At first sight it appears to be an old well-known form, and the next moment an entire stranger. The creature seems familiar when we simply regard the coloration, which first forces itself upon one's attention, as it agrees so entirely with a lightly coloured *S. pavonia* female that it could easily be mistaken for such. But the creature gives us quite a different idea when we notice that it is without doubt a well-developed male. In fact, this creature agrees entirely in structure with that of a *S. pavonia* male, but possesses the exact coloration of *S. pavonia* female.

By this crossing experiment the bright phylogenetically younger male coloration is thrown back to the phylogenetic older less brightly coloured female type. The second male is similar to this male in structure and size, but on the upper side, on the outer border of the hind wings, and in the centre of the fore wings, beneath the eye-spot towards the hind border, it possesses numerous rosy scales, and resembles the rare somewhat red type of *S. pavonia* female.

[6] Of this also very complicated hybrid, three males of the same brood were successfully reared. The largest is figured (Pl. IV. fig. 4); the others measure respectively 71 mm. and 73 mm. The mother and grandmother of

The chief points noted by observing the development of these numerous hybrids were as follows:—

1. The secondary hybrids were not only produced by pairing primary male hybrids with females of the parent species, but also with the females of a third species.

2. A larger percentage of the broods of crossings of these primary hybrids with females of the phylogenetic oldest of its parents developed, than with the females of the younger.

The results concerning crossing with the third species are too incomplete to form any opinions as to fertility.

3. The resulting brood shows in general the same characters as in the primary hybrids, in biological and physiognomical respects, but with a larger individual variability.[7] A tendency was shown to follow the line of development of the phylogenetic older form of the two, and in the three species the phylogenetic oldest form.

4. In a lesser degree there is to be found in some male individuals a capability and inclination to individual development in new directions within a narrow limit.

5. Besides males capable of limited and individually varying degree of reproduction, and females mostly sterile, or only fertile to a slight degree in the hybrid No. 13, there appeared among certain secondary hybrids a relatively large number of gynandromorphous specimens, in various crosses and in varying proportions (Pl. III. figs. 3 and 8).

6. The physiological affinity of the secondary hybrid males and also of the somewhat fertile females to the related types could not yet be ascertained, so that nothing definite can be said about it. An increase of fertility, compared with the male

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these hybrids were both very large females of the Dalmatian type of *S. pavonia*. The great size of these insects is certainly due to the greatest extent to this origin, as only one-eighth of the *S. pyri* blood of the great-grandmother remains. In general all these creatures have the appearance of large light coloured *S. pavonia* males of the Dalmatian form.

[7] In order to show these individual differences, we represent on Pl. III., figs. 1, 2, and 3, three insects of the same brood. Figs. 1 and 2, males; and fig. 3 a gynandromorphic specimen from crossing No. 10. They are bred from a large male of crossing No. 9 and a female *S. pavonia* from Zürich. The two males show great differences in wing structure and coloration.

When the much larger Dalmatian *S. pavonia* was used for crossing instead of the Zürich form, the resulting individuals of this brood, No. 10, showed still greater differences in wing measurement and coloration (see footnote 1), but they are such large specimens that it was impossible to figure them on account of room.

Further, Pl. III. figs. 6, 7, and 8 are also three brood companions, two males and a gynandromorphic specimen, from crossing No. 13.

Here also the two males, figs. 6 and 7, show great differences of size, also important differences in coloration. The original of fig. 6 has dull orange hind wings, whereas No. 7 has a pale rose colour tone, so that the colour differences of these two brothers are very great. For the gynandromorphic specimens, figs. 3 and 8, see footnotes 8 and 9.

parent, could not be ascertained in any of the numerous cases investigated, but, on the contrary, generally a decrease.

7. The broods of secondary hybrids, whether from an inpairing of these forms (No. 18, Pl. IV. fig. 3 and footnote 5) or from crossing with a true *Saturnia* female (No. 19, Pl. IV. fig. 5 and footnote 6), produced up to the present only males, which were certainly capable of reproduction.

As already stated, among certain secondary hybrids are to be found relatively numerous gynandromorphic specimens. We say gynandromorphic and not hermaphrodite specimens, because the anatomy of a number of these forms shows (it is true only such have been investigated as tended more to the female type) the male-female characters only in secondary sexual characters, *i. e.* the antennæ, wing form, and coloration, and the outer organs of the genital apparatus, but not in the primary sexual characters, that is, the egg germs. The latter showed only a slight degeneration and malformation. In other respects they were entirely of one sex.

There is no question here of true hermaphrodites, as only those individuals are regarded as such which having partially male and partially female characters; this peculiarity is also to be found in the sexual organs.

In order to go thoroughly into this extraordinary fact, the results of our experiments were as follows:—

1. The male hybrid of *S. pavonia* ♂ × *pyri* ♀ crossed with *S. pyri* ♂ No. 11 resulted in no brood in more than 60 per cent. of the pairings, and in the best case only 1 per cent. of living larvæ, of which many died.

Of the eight imagines bred, five were gynandromorphic, probably resulting from four different broods.

2. The same male crossed with *S. pavonia* ♀ No. 10 resulted in no brood in 33 per cent. of the copulations; the fertile ones producing between 4 to 62 per cent.

The resulting larvæ were not very healthy.

Of fifty-four imagines bred up to now, twelve are gynandromorphic (Pl. III. fig. 3).[8] Nine broods produced one gynandromorphic specimen each, and the 10th brood three.

3. The males of the hybrid *S. pavonia* ♂ × *spini* ♀ crossed with *pavonia* ♀ yielded without exception broods No. 13, amounting, in cases where an account was kept, to 16 to 84 per cent.

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[8] The gynandromorphic characters of the individuals of this hybrid form (Pl. III. fig. 3) can be easily seen from the figure. On the upper side, the right fore wing, the left fore and hind wings, and the abdomen are entirely of the female coloration, the right hind wing male. The antennæ are both nearly male, but with somewhat shorter feathering than usual. The male genital claspers are present in a rudimentary form at the end of the abdomen.

The under side of the wings and body show male and female characters mixed up with one another, except the right hind wing, which here again is entirely male.

Out of the two hundred and seven resulting imagines, there were only ten gynandromorphic specimens, all of which were not so characteristically developed in their gynandromorphic condition as the majority of the gynandromorphic specimens already mentioned (Pl. III. fig. 8).[9] To how many broods these ten specimens belong, and how they are distributed among the broods, I cannot exactly say. The whole of the two hundred and seven specimens were reared from nine pairs.

4. With the male of the same hybrid, that is—between *S. pavonia* ♂ and *spini* ♀—only two back crosses with *S. spini* ♀ have succeeded. From these developed 94 and 98 per cent. larvæ, but, on account of bad weather, all died except four.

The four imagines—two males and two females—were sexually normal, without a sign of gynandromorphism (Pl. III. figs. 4, 5, and footnote [2]).

5. The crossing of this same hybrid male with *S. pyri* ♀ No. 14, was in three cases infertile, most probably on purely mechanical grounds, on account of the great difference in size of the insects. Two other copulations resulted in 8 and 94 per cent. offspring (Pl. IV. figs. 1, 2, and footnote [4]). Unfortunately, on account of bad weather, most of these died of infectious disease. Of the well-developed nine imagines, none were gynandromorphic.

It must be emphasized that the gynandromorphic specimens obtained were principally female in character.

(To be continued.)

NOTES AND OBSERVATIONS.

Colias edusa, C. hyale, and Acherontia atropos in 1900.—The unusual occurrence in this country of several species of Lepidoptera during the year has furnished material for numerous communications to the 'Entomologist,' but I notice that as regards the visitation of *C. edusa*, *C. hyale*, and *A. atropos*, the bulk of these records are from correspondents who reside or have collected in the southern half of England. Reports on these species from northern sources have been few in number, and, as I think, very inadequately represent their actual distribution this year throughout the country. In a general way our northern *confrères* seem to be less desirous of exchanging ideas and experiences through the pages of entomological magazines than their fellow-students in the south, but it certainly is a matter of surprise to me that our north-country brethren have apparently regarded the occurrence of the species mentioned as unworthy of special mention. That these species have only been observed in the few northern localities from which reports have been received is possible, but, I think, improbable. Perhaps someone in each of the northern entomological centres will be good enough to communicate whatever information he may be in a position to give touching the question now raised.—Richard South; 96, Drakefield Road, Upper Tooting, S.W.

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[9] The gynandromorphic specimen of this hybrid shown (Pl. III. fig. 8) is on the upper side of wings and body predominatingly female, only on the right hind wing outside the eye spot is a bright orange-coloured patch, which changes in colour; and one can also be seen on the figure. The antennæ are almost entirely male, and the male genital claspers are well developed. Beneath, male and female characters are indefinitely mixed, only the right hind wing is entirely female (see footnote [7]).

Eretmoptera, a new Dipterous Genus.—V. L. Kellogg describes (1900, Biol. Bullet. i. 81–7) a new dipterous genus, *Eretmoptera*, from tidal pools in California, which is allied to the Nematocera, but apparently forms a new family. In both sexes the wings are strongly narrowed, while the halteres have somewhat the appearance of simple rudimentary wings. The antennæ have six segments in the male, four in the female.—G. W. Kirkaldy.

The Insect Fauna of Hampshire. — Vol. i. of the 'History of Hampshire,' one of a sumptuous series entitled "The Victoria History of the Counties of England," was published last October. It contains lists, and in some cases much useful information respecting localities, &c., of the species of all orders of the Insecta known to occur in the County of Hampshire. The editor of this division of the work is Mr. Herbert Goss, who is responsible for the Macro section of the Lepidoptera. The list of Deltoides, Pyralides, and Crambites has been contributed by Mr. W. H. B. Fletcher; that of the Tortrices, Tineæ, and Pterophori by Mr. Percy M. Bright, with annotations by Messrs. E. R. Bankes and W. H. B. Fletcher. Capt. Savile Reid and Mr. C. G. Barrett have also assisted. The Lepidoptera take up twenty-four of the fifty-four pages devoted to these lists of insects. Other well-known authorities and specialists have furnished lists as follows:—Orthoptera, Mr. Malcolm Burr; Neuroptera and Trichoptera, Messrs. R. McLachlan, J. J. F. X. King, and Kenneth Morton; Hymenoptera Aculeata, Mr. E. Saunders; Hymenoptera Phytophaga, Miss Ethel F. Chawner; Coleoptera, Rev. Canon Fowler and Mr. J. J. Walker; Diptera, Mr. F. C. Adams; Hemiptera-Heteroptera, Mr. E. Saunders; Hemiptera-Homoptera, Mr. J. Edwards.

Local Scarcity of Tæniocampa incerta, *Hufn.*—With reference to Mr. F. M. B. Carr's enquiry (*ante*, p. 204), called forth by his experience during two seasons in the New Forest, as to whether *Tæniocampa incerta* (*instabilis*) is at all local, I cannot say whether it is entirely absent from any parts of the country, but in some, at any rate, it is remarkably scarce. For many years I regularly worked the sallow-bloom in this district, which is no great distance from the New Forest, and shows a peculiarly close resemblance to it in its insect fauna, but have only taken eight specimens of *T. incerta*, all told! In 1892 I captured four examples of it, but in no other season have I taken more than a solitary individual, and it was some years before I ever met with it at all. *T. incerta* is hardly likely to be altogether absent from the New Forest, but perhaps it is equally scarce there: I have no list of New Forest Lepidoptera at hand to consult on this point.—Eustace R. Bankes; Norden, Corfe Castle, Dorset, November 4th, 1900.

Moults in the Odonata.—A perusal of the interesting notes by the Rev. Arthur East, on the nymph of *Æschna cyanea*, in the 'Entomologist' for October, prompts me to make a suggestion *à propos* of his conjecture that "the smallest nymph skin measuring 3½ mm. must be the first or second skin cast." A very few minutes after leaving the egg, some young nymphs moult. This I have observed in *Libellula quadrimaculata* (at Jena, Germany, in June, 1896), and in our American *L. pulchella* and *Sympetrum vicinum*. It is also mentioned for *Epitheca bimaculata* by Heymons (1896). It is likely that such a moult will be found to occur in *Æschna*. Previous to this first moult, the legs of the young nymph are adherent to each other and are not movable, so that Heymons says that we cannot yet speak of a larva, but of a hatched embryo. The first moult frees the legs, which are at once put into use by their possessor. — Philip P. Calvert; Philadelphia, Pa., U.S.A., Nov. 5th, 1900.

Argynnis aglaia *var.* charlotta, *Haw.* — Referring to the aberration of *Argynnis adippe* described and figured (*ante*, p. 281), it is not a little singular that the elongated silver blotches on the under side of the hind wings are precisely identical in form with those in the var. *charlotta* of *aglaia*, which Lang says used to be described by old English authors as a distinct species, and was supposed to occur nowhere else but in Britain. In 1884 I captured at Niederdorf, in the Dolomites, a fine male example of this variety; and Dr. Staudinger showed me two in his collection, taken in Germany.—R. S. Standen; Thorpe Hall, Colchester, Nov. 4th, 1900.

[In Mr. Leech's collection there are three modifications of the *charlotta* form of *A. aglaia*. These are labelled from the Engadine, and two of these are of the male sex. All three have the basal silvery spots on under surface of the hind wings confluent; but the female is fairly typical on the upper surface, and thus agrees with var. *charlotta*. The male examples, however, apart from the confluence of the basal spots referred to, exhibit different aberrational characters on both surfaces. There is a figure of an aberration of *A. aglaia* closely approaching var. *charlotta* in the 'Entomologist' for 1894, p. 182.—Ed.]

Universal List of Entomologists.—Entomologists of all countries are invited to send in their names, profession or business, order or orders studied, and full address, to Ag. W. Norbeda, Entomologist, Měhúk, Bohemia, who will be glad to insert such particulars, free of cost, in his forthcoming 'Catalogue of the Entomologists of the World.'

Epinephele tithonus in Large Numbers.—On July 30th last, while wandering among the sandhills near Christchurch in Hants, I found *E. tithonus* swarming on the bramble-bushes. The wind was rather high, and they were generally on the protected side of the bushes. On one fairly large clump I could probably have counted, would they have remained still enough, a hundred specimens. This butterfly seemed to be specially plentiful in the New Forest and neighbourhood at the end of July and beginning of August.—W. J. Lucas; Sept. 12th, 1900.

CAPTURES AND FIELD REPORTS.

Epinephele (Hipparchia) hyperanthes in Fifeshire. — As the ringlet is not a common butterfly in Scotland, it is perhaps worthy of notice that in the first week of July last a number of specimens were on the wing between hawthorn hedges near Cupar. They were of the variety which has only two spots on the under sides of the anterior wings.—Henry H. Brown; Cupar, Fife.

Lycæna argiolus and Macroglossa stellatarum.—*L. argiolus* has been very common this year, and I have seen it at Keston, Purley, Hove, and in considerable abundance round the ivy-clad walls of Pevensey Castle. I have only seen one example of *M. stellatarum*, and that at Hove.—Lewis L. Turner; 131, Melbourne Grove, East Dulwich.

Early and Late Dates for Euchloe cardamines and other Butterflies.—I think the occurrence of this butterfly in July is not at all an unusual one. Dr. Buchanan White used to take it in Kircudbrightshire in June and July (see Newman's 'British Butterflies,' p. 158). I have also the following late dates for it: July 6th, 1833; July 1st, 1875; July 16th, 1888. One was even taken in September, being a male in splendid condition, in the neighbourhood of Plymouth, by Mr. Dell (see 'Weekly Entomologist,' vol. i. p. 108). I have late specimens of a much richer and yellower white than the early ones. I do not know whether this has been previously noticed, but Newman states that he had a specimen of a beautiful canary-yellow. I have also the following early dates for it:—April 7th, 1835; April 2nd, 1854; April 15th, 1868; April 6th, 1893.

Pieris rapæ. The last I have seen this year was on Oct. 27th. In 1873 I saw it still later—on Oct. 29th. It is the first butterfly to emerge in the new year; I have taken it myself on Feb. 17th, and it has even been known to do so in the end of January. *P. brassicæ* I once met with on Feb. 22nd, 1893. On the other hand, I have no earlier record for *napi* than April 6th, 1893, although in 1830 it appeared as late as Oct. 31st.

Chrysophanus phlœas. In my experience this is the last butterfly to be seen on the wing, if we exclude the hybernating species. The last dates I have for it are Nov. 5th, 1803; Nov. 8th, 1876. The earliest dates I have for it are April 2nd, 1833, and April 22nd, 1893.

For *Pararge egeria* my dates are March 15th, 1830; March 25th, 1868; Nov. 2nd, 1866.

Vanessa cardui on Dec. 31st, 1868, and Feb. 18th, 1869. *V. atalanta* on Nov. 18th, 1824, and March 29th, 1819. *Io* on Dec. 13th, 1842; Jan. 30th, 1824; Feb. 22nd, 1825. *Grapta c-album* on Nov. 6th, 1820. —C. W. Dale; Glanvilles Wootton, Nov. 3rd, 1900.

Acherontia atropos in Hampshire. — Two pupæ of *A. atropos* were sent to me from Hampshire this year, one in August and the other in September. The gardener who sent them said he had not seen any for thirty years.—Robert Schaw More; Woodcote End House, Epsom.

Acherontia atropos in October.—A specimen of *A. atropos* was taken by Mr. Bunce, at the Round Oak Inn, Padworth, on Oct. 9th, at rest inside the bar. I saw the moth alive the same evening, at the above-mentioned inn. — Henry Garrett; Padworth House, near Reading, Berks, Oct. 25th, 1900.

MACROGLOSSA STELLATARUM.—This species has been observed here much less frequently than last year.—W. T. HARRIS; 17, Micheldever Road, Lee.

Although not quite so abundant as last year, this species has been very common in my garden all the summer, and I have this year noticed the insect, on warm evenings, visiting the flowers at dusk, a circumstance I never observed before.—(Rev.) A. NASH; Standish Vicarage, Stonehouse, Gloucestershire.

CHŒROCAMPA NERII AT TEIGNMOUTH.—A fine specimen of *Chœrocampa nerii* was taken alive on Myrtle Hill, a street bordering on the G.W.R. station, Teignmouth, on October 23rd. The gentleman who picked it up brought it to me, and made me a present of it. As I have a small collection he thought I should value it, although I make no claim to be a naturalist. But, on showing the fly to Dr. W. C. Lake, a retired practitioner, I was told that I was the lucky owner of a very rare catch. The doctor had a note, in his copy of Kirby's 'Butterflies and Moths of Europe,' to the effect that a similar insect was caught in the gardens of Trafalgar Cottage, in this town, about fifty years ago. Other specimens have been taken at Brighton and Dover. Mr. A. G. Butler, of the British Museum (Natural History), says that the Museum has one taken at St. Leonards. Since this, a gentleman of Dawlish tells me that another was found at Street, near Dartmouth. Later still, a writer in a local paper claims to have seen one feeding on geraniums in his garden, also in this county. My specimen measures 4¾ inches from tip to tip of wing, and the body is 2¼ inches in length. The colours, in sunlight, are a velvety olive-green, graduating into greys, and the pink marking is distinct. The condition is very good; the only injury is a short tear in the left hind wing. Many ladies and gentlemen of this and neighbouring towns have called to inspect the moth; and would-be purchasers have written from various parts of England (a notice of the capture having appeared in the newspapers). It is my intention to offer it to the Albert Museum, Exeter, in a short time. There it may be seen by ardent admirers of moths.—J. J. O. EVANS; Teignmouth.

LYCÆNA BELLARGUS IN HERTFORDSHIRE.—Mr. Arthur Cottam (*ante*, p. 303) records *Lycæna bellargus* as new to this county. I took the insect last year on Aldbury downs in September. The butterfly also occurs about two miles from Tring, just beyond the Hertfordshire border, though it is always rare.—N. CHARLES ROTHSCHILD; Tring Park, Tring, Herts, November 2, 1900.

COLIAS EDUSA IN OCTOBER.—I saw a few specimens of *C. edusa* in good condition at Kingsdown, on September 30th and October 1st. Several *Pieris rapæ* were also seen, but not a single example of *P. brassicæ* was observed.—G. W. KIRKALDY.

I took, freshly emerged, *C. edusa*, in rides of the New Forest, on October 17th last.—C. W. COLTHRUP; 127, Bary Street, E. Dulwich.

I took a specimen of *C. edusa* here on October 31st last. It had but recently emerged, and, although able to fly, the wings were still slightly crumpled and soft.—PERCY E. FREKE; 7, Limes Road, Folkestone.

COLIAS HYALE IN ESSEX.—*Colias hyale* has appeared here (Walthamstow) for the first time in my experience, the first specimen being taken on August 26th, in a small field of lucerne near Larks Wood; and I have taken occasional specimens since in the same place, the last on the 23rd inst. At Upminster, Essex, six were netted on the 9th inst., and two on the 11th. They were curiously local here, being confined to a railway bank over a length of about two hundred yards; some clover and patches of lucerne, apparently wild or self-sown, were growing on this bank, which may account for the insect being confined to this particular spot where I found them. At Stanford-le-Hope, in the same county, seven were secured on the 17th inst., in a large field of lucerne close to the railway station. My opportunities for collecting during the last fortnight in August—which is, I think, the best period for *C. hyale*—were very limited; otherwise I believe a large number could have been taken. The insect has evidently occurred in some plenty and over a wide area in Essex. — G. HAROLD CONQUEST; 58, Hatherley Road, Walthamstow, September 26th, 1900.

COLIAS EDUSA AND C. HYALE IN HERTFORDSHIRE.—Both these species were fairly common here in August and September, and especially so in Bucks. One example of the var. *helice* was also taken.—N. CHARLES ROTHSCHILD; Tring Park, Tring.

COLIAS HYALE IN KENT.—This species has been fairly common in most of the lucerne fields at Erith and the surrounding district. I also met with it at Folkestone, where I heard a good number had been captured, and at Dover also. I found nothing specially striking, but a female from Folkestone is of a very vivid yellow, and the spots on the hind wings are large and highly coloured. The "whites" seem to have a great antipathy to this species, and hardly let them have any peace, and sometimes render their capture tedious and difficult, often preventing it altogether. *C. edusa* has occurred also, but, as far as my experience goes, much more sparingly than its congener.—E. SABINE; Erith, October, 1900.

COLIAS EDUSA AND C. HYALE IN NOTTINGHAMSHIRE.—On August 18th I took a large number of *C. edusa* in splendid condition, and saw others frequently up to September 6th. On August 30th I obtained two *C. hyale*, both of which were of the pale form.—A. SIMMONS; Rutland House, West Bridgford, Nottingham.

Between August 12th and 24th last, six specimens of *C. hyale* were taken by myself and two friends. I also took, within the dates mentioned, twenty-four examples of *C. edusa*, and my two friends more than double this number between them. I believe that *C. hyale* has not been recorded from the county for thirty years.—G. HENDERSON; Arnold Road, Old Bashford, Notts.

COLIAS EDUSA AND C. HYALE IN SOMERSETSHIRE.—On August 18th my aunt and myself captured six *Colias edusa*, one var. *helice*, and two *C. hyale* at Huish Champflower, Wiveliscombe. During the following two days we secured eighteen *C. edusa*.—W. H. TAPP; The Hill, Bromley, Kent.

COLIAS EDUSA IN SURREY.—One morning in August my sister saw a *Colias edusa* on Epsom Common. She caught it, and I find it is a female specimen.—ROBERT SCHAW MORE; Woodcote End House, Epsom.

COLIAS EDUSA AND ACHERONTIA ATROPOS IN KENDAL DISTRICT.—Since my contributions to the October 'Entomologist' on the above species, further records have come to hand. During the latter half of September and the first part of October the weather in this locality was unceasingly wet and wild. Notwithstanding this, fresh *edusa* were found day after day settled on clover, stubble, and cut oats (which by the way has been entirely ruined owing to the prolonged wet). Careful searching has revealed two empty pupa-cases, and many must have perished in the mouldering corn. The last specimens taken were on September 28th and 30th; and the total number of captures so far ascertained is one hundred. Both males and females were very fine, and, though the latter were somewhat variable, nothing approaching var. *helice* was taken. One is reported to have been seen, but not captured, near Witherslack. Having read Mr. Frohawk's excellent articles in the 'Entomologist,' vols. xxv. and xxvi., every effort was made with the last pair captured to continue the brood, but without success—the sun absolutely refused to shine, with the result that they would not copulate; and, after living for a fortnight, the female deposited three infertile eggs, and died. With regard to *A. atropos*, the species seems to have been abundant and widely distributed in the district this season, especially in the neighbourhood of the moss lands. Pupæ are still being dug up with the potatoes; and the number of specimens traced has almost reached thirty.—(Rev.) A. M. Moss; Kendal, October 24th, 1900.

P.S.—Several of the pupæ obtained have recently died, some owing to malformation, others having sustained injury in their rough handling by potato-diggers. Two, however, have emerged, both males, of moderate size, and perfect in every respect; the first on October 30th, nearly two months from date of pupation, only slightly forced; the second on November 9th, a case of quick development, produced in a fairly constant temperature of 90° F., and plenty of moisture.—A. M. M.; Nov. 9th, 1900.

Colias edusa in Scotland.—I saw a specimen of *C. edusa* flying over a turnip field at Inverary, Argyllshire, on or about September 10th last. I succeeded in boxing it, but it escaped before I could get the box closed. I saw no other specimens.—John A. Nix; 20, Hans Place, S.W., November 2nd, 1900.

Vanessa cardui in Bucks.—I took two specimens of this insect on August 19th. Both were in good condition, and were flying along the roadside near Beaconsfield.—W. H. Barton; The Poplars, Spencer Road, Grove Park, Chiswick, W.

Vanessa antiopa in Essex.—On September 20th, G. Ruffel, one of the boys at the Countess of Warwick's School at Bigods, near Dunmow, captured a butterfly which he reported at the time to be a Camberwell Beauty, and stated that he had seen another the same day, but failed to catch it. I have been waiting to verify the record before publication, and have just received the specimen taken, which is *V. antiopa*, and I have no doubt that the captor was correct in his recognition of the other specimen. —R. Meldola; November 8th, 1900.

Sirex juvencus at Chichester.—A fine female of this giant sawfly was taken here on Sept. 28th, in the office of Mr. J. Loder Cooper, the town-clerk, by whom it was given to me. A few days later another was seen by my brother, on the pavement of one of the streets. *S. gigas* is of frequent occurrence in this locality.—Joseph Anderson; Chichester.

Neuropteron (*Linn.*) at Sugar.—In the New Forest, at the beginning of August last, several lace-wing flies were taken at sugar. One brought away and identified was *Chrysopa flavifrons*.—W. J. Lucas; Kingston-on-Thames.

Late Grasshopper.—A single female of *Stenobothrus bicolor* was taken on Esher Common, on Nov. 4th. This is much later than I have ever noticed the species, or any of its congeners, before.—W. J. Lucas; Kingston-on Thames.

Cirrhœdia xerampelina.—I took forty-three specimens of *C. xerampelina* on Aug. 23rd, 1900, all on ash-trunks and twigs around, drying their wings. I consider the scarcity is on account of entomologists in general not knowing when and how to find it.—G. Henderson; Arnold Road, Old Basford, Notts.

Note on Gonoptera libatrix.—With reference to the note (*ante*, p. 305) on the finding of pupæ of *G. libatrix* on black poplar, I may say that here the larva is regularly beaten from both sallow and black poplar. On sallow it spins the "oval white cocoon" mentioned by Newman, but on poplar makes no cocoon, simply curling over the end of a leaf, or drawing two leaves together and fastening them with a few silken threads, the pupa itself being perfectly visible between the leaves.—Frank Littlewood; Lynn Garth, Kendal, Nov. 8th, 1900.

Caradrina ambigua at Pagham.—When at Bognor, in September, I took a doubtful-looking *Caradrina*, at sugar, at Pagham, and have now been enabled to identify it as *C. ambigua*. In view of the remarkable spread of this moth round the South Coast, it may be of interest to add this capture to the records.—R. Meldola; Nov. 8th.

Gerris lacustris nymph in October.—On Oct. 14th last I was rather surprised on picking up out of a dyke on the sandhills at Deal a nymph of *Gerris lacustris*—rather late for nymphs, I thought.—G. W. Kirkaldy.

Sugaring in a Garden.—Sugaring in the garden here during October proved rather attractive. Between the 9th and 17th the following species occurred:—*Agrotis saucia, Orthosia lota, Anchocelis pistacina* (very common), *A. litura, Cerastis vaccinii, C. ligula* (*spadicea*), *Xanthia ferruginea* (common), *Polia flavicincta, Miselia oxyacanthæ* (including a good many ab. *capucina*), *Phlogophora meticulosa*, and *Hadena protea*.—Philip J. Barraud: Bushey Heath, Herts.

Notes from the Lake District.—In June I took a three weeks' holiday, from the 7th to 28th. I stayed at a place in the parish of Setmurthy, but the station, which was quite close, was labelled Bassenthwaite Lake, and was situated in the parish of Wythop. The village of Wythop was on one side of Wythop Fells and the church on the other, and the village of Bassenthwaite is on the opposite side of the lake to the station of Bassenthwaite Lake. The weather was all that could be desired, which is not always the case in the English Lake District. I did not sugar; in fact, I only took such insects as came directly under my notice. The following is a list of the Lepidoptera which I either took or saw:—*Pieris brassicæ, rapæ, and napi*; all these were very common, but in poor condition. *Euchloë* (*Anthocharis*) *cardamines*, common, and in good condition; exceedingly variable in size, some males being the smallest I have ever seen, and others the largest. *Argynnis selene*, very common and in splendid condition. *A. euphrosyne*, only caught a few, which were very worn. *Vanessa urticæ*, larvæ common everywhere, especially near Crossthwaite church and in the Vale of Newlands. I took about forty, which soon turned, and are small, but dark, with very distinct markings. *V. atalanta*, saw a few very fine specimens near Wythop church and Buttermere. *V. cardui*, saw a specimen at Braithwaite, and another in the Vale of Newlands. *Epinephele ianira* (*janira*), only saw one male. *Cænonympha pamphilus* and *Polyommatus phlœas*, both common. *Lycæna icarus* (*alexis*), caught six males, but did not see a single female, in a field off the Udale road. *Nisoniades tages*, very common and in excellent condition near Isel, and on the Udale and Aspatria roads. *Spilosoma menthastri*, one male near Ouse Bridge, and a pair near Higham. The female, taken at Higham, laid about a hundred ova, which I have fed on elder, as both dock and nettle are difficult to get at Bolton. *Hepialus humuli*. saw one male. *Phalera bucephala*, one specimen, at rest on a leaf, near Higham. *Acronycta leporina*, one specimen at rest on a willow-trunk behind the Pheasant Hotel. *Xylophasia monoglypha* (*polyodon*), made the acquaintance of one in my bedroom. I was fortunate enough to see no more. *Euplexia lucipara*, caught one in bedroom. *Plusia pulchrina* and *P. gamma*, one of either kind. *Euclidia glyphica*, saw one or two on the Udale road, along with *selene*, *pamphilus*, and *tages*. *Rumia luteolata*, very common after dusk along the lane hedges. *Boarmia repandata*, one very dark specimen in woods on Armathwaite estate, off the Udale road. *Geometra vernaria*, one specimen at Higham. *Iodis lactearia*, one specimen off Udale road. *Cabera pusaria* and *exanthemaria*, both exceedingly plentiful. *Abraxas* (*Zerene*) *grossulariata*, only saw one larva by the roadside near Cockermouth. *A. sylvata* (*ulmata*), very common near the Wythop Estate Woods; took over sixty one afternoon, at rest on low plants. *Lomaspilis marginata*, common everywhere. *Larentia viridaria* (*pectinitaria*), took one specimen resting on an ash-trunk by Wythop Estate Woods. *Thera juniperata*, fairly common. *Melanthia ocellata*, *Melanippe sociata*, *M. montanata*, and *Camptogramma bilineata* were all common. *Bupalus piniaria*, males common everywhere, but did not see any females. *Eubolia plumbaria* (*palumbaria*), fairly common off the Udale road. *Tanagra atrata* (*chærophyllata*), common in the same places as *E. plumbaria*. *Botys urticalis*, saw a left primary of this species on a nettle, Coleoptera.—*Cicindela campestris* var. *funebris*, caught one specimen near Crummock Water, where it seemed common. *Melolontha vulgaris*, common. *Phyllopertha horticola*, very common on bracken near Buttermere, and in the Vale of Newlands; less so on Lattrigg. *Corymbites æneus* and *cupreus*, one specimen of the former; the latter was common on Lattrigg. *Lampyris noctiluca*, four males flew in at the bedroom window about 11 p.m., evidently attracted by the candle. *Rhagium inquisitor* and *bifasciatum*, one specimen of each; the former on the boat-house, the latter flew out of some pine woods.—Oscar Whittaker; Morelands, Heaton, Bolton, Aug. 21st, 1900.

Three Days' Collecting at Deal.—Three days is not a long time to work up a strange locality, but having nothing else to do from July 31st to August 3rd, I determined to run down to Deal, my principal object being to try and obtain a series of *Lithosia pygmæola* and *Liparis chrysorrhœa*, the former of which I understood to be getting very scarce, and the latter very common in this particular locality. I was also anxious to see the old place again, as in my early school days I had spent three summer holidays there, and had then collected butterflies in a more or less casual way; in 1886, the last of these three years, capturing, and recording in this magazine, *Colias edusa*, var. *helice*—this record, by the by, being my earliest effort in print, being then only twelve years old. It is curious that this my next visit should again be during a "*Colias*" year.

I put up at a boarding-house in the Sandhills, "Martinsfield" by name, and I may say that anyone working Deal could not do better. The catering is very good, the rooms comfortable, and the position is close to the best treacling ground; there are also two bungalow bedrooms, one of which should be secured beforehand, as one is then able to get in and out at any time of night. In the garden at "Martinsfield" there is a large quantity of privet, which attracted Vanessas and *Macroglossa stellatarum* by day, and countless moths by night. As, however, moths were even more plentiful on treacle, I did not work this privet beyond a final quick look round before turning in. Still, it might be very useful if treacle were not paying.

Arriving about 3.30 on 31st, I commenced operations during my lunch by boxing three *Amblyptilia acanthodactyla* and one *Acidalia imitaria* off the dining-room ceiling, and immediately after netted a fine *M. stellatarum* over the garden privet. Up to dinner time I did nothing much except prospecting the ground and putting treacle on some hundred odd posts, in two lines of fences running across the sandhill half-a-mile apart. This plan worked well, as the space between the two gave a good opportunity for working for *Lithosia pygmæola*, &c.

This little "footman" has certainly become very scarce, as hard work on three evenings only produced eight specimens in all. Only one was netted at dusk, two more on treacle, and the others at rest on the marram grass stems. In this situation they are very conspicuous in the lamplight, and I feel sure I did not miss any over the ground I searched. The three nights, however, were all very windy, and probably a still, warm night is wanted for this species, as for *Nudaria senex*, in the Fens. The wind, though very strong, was south-west, and did not in any way interfere with treacle. On the contrary, the best posts were the most exposed ones—two or three on a high sand-hill, and others on a shingle ridge at the top of the beach. being always the most favoured.

There was a truly vast assemblage of moths, the last night being the best. The commonest species was undoubtedly *Xylophasia polyodon*, of which I took one almost black; then came in order *Amphipyra tragopogonis*, *Triphæna pronuba*, *Agrotis tritici*, *Hydræcia nictitans*, and *Agrotis puta*, all in the finest possible condition. I took long and variable series of *A. tritici* and *H. nictitans*, and some nice forms of *T. pronuba*, amongst which I picked out one fine *T. fimbria*. but *A. tragopogonis* and *A. puta* were wonderfully constant. *A. valligera* was much scarcer, only about half-a-dozen each night, and there were no *A. cursoria*, a species I rather expected. *A. suffusa* occurred in about the same numbers as *A. valligera*, and was as usual in grand condition, whilst *A. nigricans* was a bit commoner and very variable, but nowhere near *tritici* in numbers. Amongst a number of common Caradrinas, a close search failed to turn up *C. ambigua*, in this almost its earliest British locality. A specially striking feature (more noticeable, perhaps, after several "fen seasons") was the scarcity of "wainscots." Even *Leucania impura*, which was the commonest of them, rarely visited the treacle, being far fonder of the flowering heads of marram grass, where it kept company with *H. nictitans*, *Cerigo cytherea*, and *Miana furuncula*, the few *Lithosia pygmæola* taken being all on the stems. Six *L. conigera* were the only other *Leucanias*, all but one on treacle, and the other on grass; and, in one little corner where the fence ended at a reedy dyke, *Cœnobia despecta* occurred sparingly, both on treacle and round the reeds at dusk. *Calamia phragmitidis* did not come to treacle, although

I kicked one up in the evening on the neighbouring pasture land very worn. The only other species worth mentioning were *M. literosa* (scarce), and two very poor *Apamea fibrosa*. It is curious that the latter should be so worn, as three or four days later, last year, they were only just coming out at Wicken Fen. Most of the above also occurred commonly on the privet, and, in addition, plenty of *Plusia gamma* and *Hadena chenopodii*, the latter being very scarce on treacle. This species I also saw on the privet in the day time, flying with *P. gamma* in the afternoon sun. Whilst working for *L. pygmæola*, and when putting on the treacle, *Mesotype virgata* occurred sparingly, and, amongst the Crambi, *C. perlellus* and var. *warringtonellus* (common) and *C. contaminellus* (very scarce).

I worked hard during the two and half days I had, although the first day and last morning were very wet, and the second day so exceedingly windy that scarcely anything flew except under shelter. On August 2nd, however, in sheltered spots, butterflies were very abundant, and I then got my first glimpse of *Colias hyale*, netting two fine males on the Kingsdown cliffs. This first indication of a *Colias* year was abundantly realised when during the next fortnight I took large numbers of both *C. edusa* and *C. hyale* at Littlehampton.

I walked along the cliffs in the wind to St. Margaret's Bay, and here found *Argynnis aglaia* common, but small and mostly worn. *Lycæna corydon* literally swarmed, but it was too windy to work for vars. *Lycæna astrarche* was fairly common (but more plentiful on the sand-hills), and a single female *L. argiolus* occurred in Upper Walmer. *Pyrameis cardui* turned up everywhere, defying the wind with its strong flight, and *Melanargia galatea* was common on the Kingsdown cliffs. This species was also very small compared with some taken at Chattenden a fortnight earlier. *Polyommatus phlæas* was abundant, and the specimens uniformly dark and dusky, some of them being very extreme in this direction. This darkening in colour was probably due to the effect of the excessive heat of mid-July upon the pupæ. I found *Liparis chrysorrhœa* at once on the first morning, and, although exceedingly local, it was abundant in its special locality, so abundant in fact, and the food so limited, that I should imagine the larvæ would next year be in great danger of starvation.

The hawthorn bushes in this spot are few and stunted, and from one of them, not two feet high, I took eleven females, and counted twenty-one batches of eggs. From a larger bush I took twenty-three females, each one having a batch of ova beside her, and every bush had several specimens, in many cases ten or more. There were also a number on blackthorn and wild rose. I had no hesitation in taking a large number of specimens, all but two having oviposited, and consequently minus their "tails," which of course are used as a covering for the ova, but, curiously enough, could only find three males. Their condition, owing to the rough weather, might have been better, but many were very fair indeed. The batches of eggs, judging from the ten I brought home, are very large. Three of them, in a chip box, hatched unawares, and disported themselves on a lace window-curtain, making such a show that I wished the batches had been smaller. *Leucoma salicis* was also very common on a row of small poplars, both sexes equally, sitting on the under side of the leaves, in the same way as *L. chrysorrhœa* did on the hawthorns; and a long series of *Bryophila perla* was taken off walls in the town, two, with a bright orange-yellow ground colour, coming off a wall covered with a bright yellow lichen.

On the Kingsdown cliffs I spent about an hour each day searching knapweed blossoms for *Eremobia ochroleuca*, and by this means secured six fine specimens and left a seventh bad one. They were all sitting well in the centre of the flowers, but I could find none on scabious, which I believe they are supposed generally to favour. *Aspilates gilvaria* was common on the slopes at St. Margaret's Bay, and *Eubolia bipunctata* literally swarmed on the chalk, rising in confusing numbers at every step, in company with countless *Plusia gamma*. *Melanippe galiata* and *M. rivata* occurred, but were scarce; and amongst the plumes *Amblyptilia acanthodactyla*, *Mimæseoptilus bipunctidactylus*, and *Pterophorus monodactylus* were walked up commonly. *Pyrausta purpuralis* was also in great evidence when the sun shone.—Russell E. James; 18, Onslow Gardens, Highgate, Sept. 17th.

Erratum.—Page 281, line 2 from bottom, for July read September.

SOCIETIES.

Entomological Society of London.—*October* 17*th*, 1900—Mr. G. H. Verrall, President, in the chair. Mr. J. Digby Firth, The Grammar School, Chorlton-cum-Hardy, near Manchester, was elected a Fellow of the Society.—Mr. A. H. Jones exhibited a series of *Pararge mæra*—a light form resembling *P. megæra*, from the Basses Alpes and the Cévennes; a dark form approaching *P. hiera*, from Cortina; and an intermediate form, from the Italian Lakes; also a variety of *Lycæna corydon*, female, in which the under wing showed a decided blue coloration, taken at Lago di Loppio, near Riva. Dr. Chapman suggested that the union between the three named species of *Pararge* was very near, if the species were not indeed identical.—Mr. A. J. Scollick exhibited a specimen of *Cethosia cyanea*, a species inhabiting North-west India, which had been taken this year on the wing near Norwich. It was suggested by Mr. Distant that this was a case of accidental importation, probably in the pupal condition.—Mr. H. Rowland-Brown exhibited specimens of *Erebia glacialis*, taken this year on the Stelvio Pass, showing transitional forms to the var. *alecto*. He said that the typical form and the variety were not found flying together, but on opposite sides of the valley. Dr. Chapman observed that the darker specimens approached to the form of *E. melas* found in the neighbourhood of Cortina-di-Ampezzo. Specimens of *E. glacialis* also exhibited from Saas Fée and Evolena showed marked inferiority in size and brilliancy of colour.—Mr. W. L. Distant exhibited a piece of Hawkesbury sandstone from Australia, showing the borings of Termites, and, in connection with the same, communicated a note from the 'Proceedings' of the Linnean Society of New South Wales (pt. iii. 1899, p. 418), as follows:—"Mr. D. G. Stead exhibited specimens of Hawkesbury sandstone—(1) from the sea-shore between tide-marks, showing the tunnelling of marine Isopods (*Sphæroma*) with the living animals *in situ*; and (2) from the hill-tops overlooking Port Jackson, offering examples of the borings which so often attract notice, and the production of which has been attributed to Hymenoptera and also to the Termites. Since last meeting Mr. Stead reported that he had investigated the matter, and that, after breaking up a quantity of stone, he had come upon Termites, of a species at present undetermined, actually at work, specimens of which he exhibited."—Mr. M. Burr exhibited a male and female specimen of *Anisolabis colossea*, Dohrn., from New South Wales—the largest known earwig in the world.

November 7th, 1900. — The President in the chair. — Dr. John Cotton, of 126, Prescot Road, St. Helen's; Mr. George H. Howes, of Spey Street, Invercargill, New Zealand; the Hon. F. M. Mackwood, M.I.C., of Colombo, Ceylon; Mr. William J. Rainbow, of the Australian Museum, Sydney; and Mr. Percy Charles Reid, of Feering Bury, Kelvedon, Essex, were elected Fellows of the Society. — Mr. George S. Saunders exhibited specimens, from Devonshire, of *Pieris rapæ* and *Plusia gamma* caught by the proboscis in flowers of *Araujia albens*, Don, a climbing plant of the natural order *Asclepiadaceæ;* and explained the nature of the mechanism by which the insects were entrapped by the flowers. He also showed specimens of the "bedeguar" gall formed apparently on the "hips," or fruit, of *Rosa canina*, the formation of the galls on the hips being considered unusual. They were taken from a small briar about four feet high, having more than thirty of these galls, which was growing on the top of the North Downs near Reigate. Mr. Gahan remarked that the capture of insects by *Araujia albens* had recently been investigated in France by MM. Marchand and Bonjour, whose account appeared in the 'Bulletin de la Soc. des Sciences Nat. de l'Ouest de la France' for 1899. These authors concluded that insects were captured only by immature flowers, the anther-wings, in the cleft between which the proboscis of the insect is caught, being at that time stiff and resistant; but when the flowers are ripe the anther-wings become less rigid and do not offer sufficient resistance to the withdrawal of the proboscis, which carries with it the pollinia ready to be transferred to the stigma of the next flower visited by the insect. — Mr. Tutt exhibited, for the Rev. Mr. Burrows, a large series of *Epunda lutulenta* from Mucking, in Essex, and made remarks upon several interesting variations included in the series. — Mr. W. J. Kaye exhibited *Hydrocampa stagnalis*, var., with examples of the typical form for comparison; the variety differed in having the basal line nearly obsolete, the sub-median double line much strengthened internally and reduced externally, and the cross-band connecting the sub-median and post-median bands almost entirely obliterated. — Mr. F. Merrifield exhibited a variety of *Argynnis dia* taken with a few examples of the ordinary form at Ilanz, in the Vorder Rhein Valley, early in September last, when what was, he believed, a third brood of this species was abundant; the variety was much blackened on the basal half of all the wings.—Canon Fowler exhibited a specimen of *Orochares angustatus*, Erichs., a Staphylinid beetle new to the British list, taken at Leverstock Green, Herts, by Mr. Albert Piffard.—The Rev. F. D. Morice mentioned as a fact of some interest that in a nest of *Formica sanguinea* at Weybridge, in which he found males and workers of that species, he found also males and females as well as workers of the slave-ant *Formica fusca*, an experience samewhat different to that of Huber and Darwin, who stated that workers only of the slave-species were found in the nests of *sanguinea*.—The Secretary read "Some notes on variations of *Zeritis thysbe*, Linn.," communicated by Mr. H. L. L. Feltham, of Cape Town, and, on the latter's behalf, exhibited one female and two male specimens of one of the rare forms referred to in the paper. This form was originally noticed by Mr.

Trimen as an "aberration." Mr. Feltham succeeded in taking several specimens on the summit of the mountains overlooking Minzenberg, and was inclined to consider it a distinct dark variety. He requested that the specimens exhibited should be placed in the British Museum collection.—C. J. GAHAN and H. ROWLAND-BROWN, *Hon. Secs.*

RECENT LITERATURE.

AUG. LAMEERE. *La raison d'être des métamorphoses chez les Insectes; Discours du Président à l'Assemblée Générale de la Société Entom. de Belgique* (1900, Ann. Soc. Ent. Belg. xliii. (for 1899) pp. 619–36).

AUG. LAMEERE. *Notes pour la Classification des Coléoptères* (1900, *l. c.*, xliv. pp. 355–76, and Classificatory Table).

Whatever may be the ultimate reception afforded to the views propounded in these two papers, no one will be disposed to deny their—in great part—boldness and originality, or the intimate knowledge of entomology upon which they are based.

The author considers that the ancestors of other winged insects cannot be found among the Amphibiotica—and consequently that wings have not been developed from tracheal branchiæ—for they, as well as their near allies the Orthoptera and Embioptera, have a large number of malpighian tubes, while almost all the other winged insects have but few, and a vanished organ (according to the "law of irreversibility of evolution") never reappears, nor does a perfected organ return to a former simple state.

Five orders are embraced by the Holometabola, *viz.*:—Neuroptera (Planipennia and Plicipennia), Coleoptera, Diptera, Lepidoptera, and Hymenoptera; these are all closely allied, and are probably monophyletic, the last four being specialised Neuroptera. The Rhipiptera are considered to be evidently the last term of evolution of the Rhipiphoridæ, therefore coleopterous, while the Fleas (Pulicidæ), which up to the present have been universally regarded as either dipterous or—according to the recent researches of Brauer and Heymons—forming a separate order (Aphaniptera), are positively stated to be coleopterous, belonging without doubt to the group of Staphylinoides of Ganglbauer. It is noted in passing that the antennæ are composed of eleven, and not three, segments, as formerly supposed.

On one point we are not altogether certain of Prof. Lameere's meaning. On page 622 the Cicadidæ are cited as an exception to the rule that the Rhynchota have a direct development; and on page 627 it is stated that this family possesses a true larva, adapted to a subterranean life, and offering especially this peculiarity, *viz.* that the anterior legs are, during this period—sometimes very long—of the insect's existence, curiously modified into digging apparatus.*

Now we do not think that these statements are borne out by the actual facts. It is true that the terms "larva" and "pupa" are loosely used by many entomologists in speaking of Rhynchota, Ortho-

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* Les Cicadides ont une véritable larve adaptée à une vie souterraine, et offrant notamment cette particularité que ses membres antérieurs sont pendant cette période, parfois très longue, de l'existence de l'insecte, curieusement modifiés en appareils fouisseurs."

COLEOPTERA.

- STAPHYLINIFORMIA.
  - Silphidae.
    - Silphinae.
    - Clambinae.
    - Sphaeriinae.
    - Hydroscaphinae.
    - Scaphidiinae.
    - Corylophinae.
    - Trichopteryginae.
    - Scydmaeninae.
  - Histeridae.
  - Staphylinidae.
  - Pselaphidae.
  - Platypsyllidae.
  - Pulicidae.
- CARABIFORMIA.
  - Rhysodidae.
  - Carabidae.
  - Paussidae.
  - Dytiscidae.
    - Omophroninae.
    - Haliplinae.
    - Amphizoïnae.
    - Hygrobiinae.
    - Hydroporinae.
    - Dytiscinae.
  - Gyrinidae.
- CANTHARIDIFORMIA.
  - Lymexylidae.
  - TEREDILIA.
    - Anobiidae.
      - Anobiinae.
      - Ptininae.
    - Bostrychidae.
      - Lyctinae.
      - Bostrychinae.
    - Cupesidae.
    - Derodontidae.
  - MALACODERMATA.
    - Cantharididae.
      - Cantharidinae.
      - Lycinae.
      - Lampyrinae.
      - Drilinae.
    - Melyridae.
      - Malachiinae.
      - Melyrinae.
      - Corynetinae.
      - Clerinae.
  - STERNOXIA.
    - Dascillidae.
      - Dascillinae.
      - Chelonariinae.
      - Eucinetinae?
      - Cyphoninae?
      - Cebrioninae.
    - Elateridae.
      - Perothopinae.
      - Eucneminae.
      - Cerophytinae.
      - Soleniscinae.
      - Elaterinae.
      - Throscinae.
    - Buprestidae.
  - Macrodactylia.
    - Parnidae.
      - Psepheninae.
      - Parninae.
      - Elmidinae.
  - Dermestidae.
  - Brachymera.
    - Byrrhidae.
      - Byrrhinae.
      - Nosodendrinae?
  - Palpicornia.
    - Hydrophilidae.
      - Helophorinae.
      - Hydrophilinae.
  - Nitidulidae.
    - Hypocephalinae
    - Sphaeritinae.
    - Trogositinae.
    - Nitidulinae.
    - Byturinae.
  - CLAVICORNIA.
    - Mycetophagidae.
    - Cisidae?
      - Sphindinae?
      - Cisinae.
    - Erotylidae.
      - Cryptophaginae.
      - Erotylinae.
    - Phalacridae.
    - Colydiidae.
    - Lathridiidae.
    - Endomychidae
      - Mycetaeinae.
      - Endomychinae
    - Coccinellidae.
    - Cucujidae.
      - Cucujinae.
      - Helotinae.
  - PHYTOPHAGA.
    - Brenthidae.
    - Cerambycidae.
    - Chrysomelidae.
    - Bruchidae.
      - Bruchinae.
      - Anthribinae.
    - Curculionidae.
  - Tenebrionidae.
  - HETEROMERA.
    - Melandryidae.
      - Melandryinae
      - Mordellinae.
      - Rhipiphorinae.
      - Stylopinae.
    - Lagriidae.
      - Lagriinae.
      - Pythinae.
      - Pyrochroïnae.
      - Meloïnae.
      - Oedemerinae.
      - Anthicinae.
  - Lamellicornia.
    - Lucanidae.
      - Lucaninae.
      - Troginae.
    - Scarabaeidae.
      - Scarabaeinae.
      - Melolonthinae.
      - Dynastinae.

ptera, &c., when "nymph" ought to be employed for all the stadia between the ovum and the imago; but the learned Belgian has evidently not fallen into this error, for he speaks of "une véritable larve." So far as our knowledge goes, the Cicadidæ are certainly no exception to the general direct development in the Rhynchota, inasmuch as there is no "resting-stage" as in the true Holometabola; "the larval and pupal changes * in the periodical Cicada are normal" (Marlatt, "The Periodical Cicada" [1898, U. S. Dep. Agriculture, Entom. Bull. 14, N. S. p. 84]). As regards the structure of the legs, moreover, the author of the work just cited states that this is "perhaps the best means of distinguishing the adolescent stages of" the periodical Cicada (*Tibicen septendecim* (Linn.)) "from other Cicadas" (*l.c.*, p. 85). On the other hand, we ourself possess nymphs, in two stages, of an Oriental species of *Dundubia*, in which the anterior legs are developed quite as greatly, proportionately, as in *Tibicen*. It must also be remembered that the anterior femora are of very considerable size in almost all the Cicadidæ in the imaginal stage.

We reproduce the classificatory table of Coleoptera, merely noticing that the Lymexylidæ are supposed to be the nearest to the ancestral Planipennian Neuropteron, and that the presence of an ocellus, or of ocelli, in certain Dermestidæ and Staphylinidæ, points to the high antiquity of these families. The Cantharidæ are perhaps more generally known as Telephoridæ, while the Cicindelidæ of authors are swallowed up in the Carabidæ. After the inclusion of the fleas in the order, the most daring innovation is perhaps the removal of the Brenthidæ from association with the Rhynchophora and other Phytophaga and the placing of them in the Clavicornes. (See opposite.)

G. W. K.

L. O. Howard. *Notes on the Mosquitoes of the United States* (1900, U. S. Dep. Agriculture, Div. Entom.; Bull. 25, N.S., pp. 1–70; 22 figs.).

This valuable addition to the numerous practical bulletins issued by the U. S. Department of Agriculture consists of introductory remarks upon mosquitos in general, their connection—vigorously discussed and experimented upon in all quarters at the present time—with malaria, their life-history, natural enemies, and remedial measures against their presence and attacks. A synoptic table is furnished of the five genera—*Anopheles*, *Ædes*, *Megarhinus*, *Psorophora*, and *Culex*—and of the twenty-three recognized and eighteen unrecognized species of the North American fauna. Figures of several of these, in various stages, are inserted in the text.

Mosquitos appear to be, occasionally, sad victims of alcoholic intemperance. Dr. Gray, of St. Lucia, quoted by Dr. Howard, relates how he put a few mosquitos "under a bell-jar one day, in order to watch them. I put a single drop of port wine under the jar, as I had heard that mosquitoes could be kept alive for a long time on wine. When I went to look at them a few hours later, I found them all apparently dead, so I put them in a dry bottle, intending to pin them later. When I went to pin them, shortly afterwards, they were all staggering about in a most extraordinary manner—they were drunk!"

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* By the context it is evident that "nymphal" changes are intended.

Having regard to the heavy charges laid—and proved—against the female mosquito, it is only fair to say that it is only the males, apparently, who indulge in bibulous pleasures.

As to the alleged breeding of mosquitos in mud, the author believes that they must necessarily all perish when the mud dries up completely, but that they may be able to live for some little time in sufficiently wet mud.

Mosquitos exist over almost the entire globe. Dr. Bessels, of the Polaris Expedition, was obliged to interrupt his work in lat. 72° N.; while in Texas "hundreds of thousands of millions" of these insects blow in upon the towns when the wind is in certain directions. They are, however, devoured in enormous numbers in their immature stages by the Hydrophilidæ, Dytiscidæ, various fish, and by the larvæ of dragonflies; while in the winged state they fall an easy prey to dragonflies and various birds, an observer finding six hundred in the crop of a night-hawk.

As preventives and remedies for use in houses, the author favours a thorough screening and mosquito bars about the bed, and the burning of pyrethrum powder; for bites, glycerine or indigo; and for the destruction of larvæ and the abolition of breeding-places, the pouring of kerosene on the breeding-pools, or the introduction of fish into fishless breeding-pools.

G. W. K.

MALCOLM BURR. *Collecting in South Eastern Europe* (1899, Trans. Oxford Univ. Jun. Sci. Club, pp. 112–6).

The author briefly describes the general features of the little-known Herzegovina, Dalmatia, and Montenegro, and enumerates the principal insects encountered. The fauna does not appear to be very rich, although three new species of Orthoptera (*Platycleis* spp.) rewarded the author's endeavours. Two of these, captured at Tisavica, appeared to have an extraordinary distribution, for Mr. Burr "failed to find a single specimen of either species outside the few beds of nettles to which each appeared to be confined."

Mr. Burr bears a good Scottish forename, though we believe he is an Englishman; but he is certainly qualifying for an Irishman by the following remarkable sentences: "The father of the present Prince fell in love . . . . . it so happened that he died childless."

G. W. K.

C. DARWIN. *Origin of Species.* New Impression (John Murray). 1900.

This new impression is a reprint of the sixth (1872) edition, and is well printed, though the paper is rather thin. It has been long anticipated, as the copyright will shortly be out. A fine portrait forms the frontispiece. As the price is exceedingly low there is now no excuse whatever for the absence of this classic from the shelves of any one having the remotest claim to the title of "zoologist."

G. W. K.

OBITUARY.—The regretted death of JOSEF MIK on the 13th October is announced. The well-known Austrian dipterist was one of the joint editors of the 'Wiener Entomologische Zeitung,' in which he published a very large number of small papers.—G. W. K.

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New Genera and Species are marked with an asterisk.

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ERRATA, &c.

Page 99, fourth line from bottom, for "50" species read "57."
,, 100, delete first line.
,, 133, third line from bottom, for "sypical" read "typical."
,, 206, third line from bottom, for "an hermaphrodite" read "gynandromorphous."
,, 232, footnote, lines 2 and 4, for "Montaudon" read "Montandon."
,, 238, line 15 of third paragraph, for "avirous" read "avirons."
,, 238, first footnote, line 3, for "devous" read "devons."
,, 238, second footnote, line 1, for "pratiquerous" read "pratiquerons."
,, 239, line 4 of third paragraph, for "avous" read "avons."
,, 239, footnote. N.B.—This refers to the "Iconographie," not to the "Hémiptères."
,, 264, footnotes 12, 13, and 14 have been transposed; 12 should be 13, 13 should be 14, and 14 should be 12.

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